LEVEL II

AIR FORCE

STUDY SKILLS PACKAGE:
DEVELOPMENT AND EVALUATION

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Final Report

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

Materials contained within this report are designed to diagnose and remedy student study skill deficiencies in the areas of (a) reading comprehension, (b) memorization, (c) test taking, and (d) concentration management skills. The study skills materials were separately packaged to allow partial or total remediation in the four areas, as required, and each package incorporated concepts of active student involvement in the material to be learned (e.g., mnemonic techniques, behavioral self-control strategies). In addition, materials and procedures used in an Instructor Orientation and Training Workshop are included. A package was designed to provide instructors using computer-managed instruction with basic diagnostic and tutorial skills required to assist in their effective use of the study skills materials and to help them transition into their new role as facilitator of student learning. Evaluation.

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data from an implementation of the student and instructor skill training materials in the Air Force Advanced Instructional System suggest that consistent student training time reductions and performance gains can be obtained by the use of the study skills materials. The Study Skills Questionnaire was also found to be a reliable and valid measure of student skills in the four areas, and reliably discriminated students performing satisfactorily versus poorly in the Advanced Instructional System technical training environment. Furthermore, the Instructor Orientation and Training was found to assist in the efficient remediation of student study skill deficiencies and to contribute to improved instructor perceptions of their role in computer-managed instruction.

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STUDENT STUDY SKILLS PACKAGE

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

LIST OF TABLES

ACKNOWLEDGEMENT

SUMMARY

PROJECT OBJECTIVES

The goals of the Computer Managed Instruction (CMI) Student Skills Project were to (a) determine the characteristic problems which students encounter in a CMI system and those strategies which effectively help students cope with these problems; (b) design, develop, implement, and evaluate a small set of self-contained instructional modules for increasing the effectiveness with which students adapt to and perform in a CMI environment; and (c) investigate procedures for individualizing assignment of these modules so as to minimize training time and cost. The project was conducted in the context of the Air Force Advanced Instructional System (AIS), at Lowry AFB, Colorado. This system presently manages four technical training courses: Inventory Management (IM), Materiel Facilities (MF), Weapons Mechanics (WM), and Precision Measuring Equipment (PME).

STUDY SKILLS PACKAGE OBJECTIVES

The major design goal of the Study Skills Package was reduction of course completion time. That is, the objective of this set of modules was to provide poorly skilled students with appropriate study skills which would improve their performance and reduce the amount of time required to complete the course. A subsidiary goal was to provide instructors with appropriate pedagogical tools to help them become efficient diagnosticians, tutors, and/or facilitators in the remediation of study skills deficiencies, thereby enabling them to help students become efficient learners. In other words, this set of materials was designed to enhance student study skills and to provide instructors with specific tools they could use to fulfill their role in a CMI environment.

METHODS

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In order to determine the characteristic problems which students experience in a CMI environment, individual student interviews were conducted by the evaluators at the beginning of the CMI Skill Module Project. The major product of the results of these interviews was the design, development and evaluation of the Orientation/Time Management Module (see AFHRL-TR-79-14). A subsidiary product resulted from the observation that students often need assistance in improving their study skills and in adapting these skills to a CMI environment. Thus, a second set of interviews was conducted to permit a better understanding of the student study skill problem.

The results of these student interviews, along with interviews with students who had been eliminated from the course and interviews with instructors and supervisors, formed the basis for the design of a Student Study Skills Package. This package contained a Study Skills Questionnaire and separate skill training in the areas of Reading Comprehension,

Memorization, Test Taking, and Concentration Management. Additionally, an Instructor Orientation and Training Package was designed to give instructors practice in the techniques and strategies in the four Study Skills Modules and to teach them those basic diagnostic and tutorial skills required to individualize the assignment of students to the four Study Skills Modules. The goal of the instructor training was not only to provide instructors with specific training in their role in student study skills remediation, but also to give them a better perception of their role as facilitator of student learning in a CMI environment.

RESULTS AND CONCLUSIONS

In the Study Skills training area, the findings of relevance were those resulting from the operational tryout of the four modules (Reading Comprehension, Memorization, Test Taking, Concentration Management) in the IM, MF, and WM courses. Although the number of cases for this evaluation was small, the findings of dramatic improvement in block times and scores following study skills remediation were so consistent as to warrant the conclusion that this training met the goal of increasing student efficiency and effectiveness in a CMI environment. There was also some evidence that providing students with study skills training improved their perceptions of their study skills, particularly if the training was given in more than one study skills area, and that the training continued to affect their performance throughout the course.

The Study Skills Questionnaire was subjected to a full summative evaluation in which data on both the reliability and validity of the questionnaire were collected in the four AIS courses. The results indicated that not only were the Questionnaire and its subscales found to demonstrate good reliability and construct validity, but the results of the predictive validity analyses (conducted in IM and WM only due to large number of students in these two courses) indicated that this test could reliably discriminate those students who would perform satisfactorily versus poorly in a CMI environment such as the AIS. Furthermore, the Questionnaire reliably discriminated between the groups for block times and scores, as well as lesson times and scores, suggesting the sensitivity of the Questionnaire to different CMI criterion variables. Another finding of importance was that the ability of the Questionnaire to predict performance did not decrease from early to late blocks of either the IM or WM courses.

Evaluation data for the Instructor Orientation and Training Workshops were provided both by the instructor critiques of the workshop training content and procedures, and by instructors' subsequent use of their new skills in the assignment of students to particular study skills materials. Instructor comments from the small group and operational tryouts of the workshops were generally very favorable, with a majority of the 27 participating instructors indicating that they liked the content and format of the workshops. Unfortunately, however, not all of these instructors had the opportunity to assign study skills materials to

students in their courses due to changes in their duty assignments following the workshop training. Of the 9 instructors in the IM, MF, and WM courses who were able to assign the materials, an average of more than 2 students per instructor were given study skills module(s) assignments. Judging by discussions with instructors and data clerks in these courses, however, these numbers are misleading in that substantially more study skills assignments were made but were not recorded in the AIS data base. It was concluded that the Instructor Orientation and Training was at least moderately successful in promoting the remediation of study skills problems--a finding further substantiated by the consistent improvements in student block times and scores following this remediation. In addition, the training appeared to have a positive effect on instructor role perceptions and attitudes.

RECOMMENDATIONS FOR USE OF MATERIALS PRODUCED IN THIS PROJECT

1. The Study Skills Questionnaire should be made part of each course's preassessment battery or placed in the first course block, so that it can be used to help identify students with specific study skills problems or those who will have difficulty successfully completing the course.

2. The 4 Study Skills Modules should be reproduced in sufficient quantity to be used by students identified as having study skills problems.

3. An Instructor Orientation and Training Workshop in those skills required to effectively use the Study Skills Questionnaire and Modules should become an on-going in-service training program in each course.

IMPLICATIONS FOR FURTHER RESEARCH

This project has demonstrated the positive benefit of student skill training on reducing the costs of military technical training by helping students and instructors become more efficient and effective in their respective roles. There are, however, at least 3 questions that remain unanswered. First, research aimed at individualizing the assignment and/or reassignment of study skills training is necessary in order to obtain maximum benefit from this type of training. Second, additional research which isolates the cut-off scores on the Study Skills Questionnaire which are most reliably related to student performance (times, scores) in CMI technical training courses, as well as to their need for particular types of study skills remediation, is needed to further the usefulness of this measure. Third, a critical need exists to explore the types of roles required of instructors in a CMI environment, particularly as these relate to their function of facilitators of the learning process, and specific instructor training packages need to be developed and evaluated in CMI technical training environments.

1.0 INTRODUCTION AND OVERVIEW OF CMI SKILL MODULES PROJECT

The benefits to be derived from CMI, within the framework of large-scale military technical training, are very promising. CMI is an individualized instructional system in which the majority of the students' instructional activities are completed off-line, in contrast to computer-assisted instruction (CAI) where all instructional activities are conducted on-line at an interactive computer terminal. The computer's role in CMI is that of evaluator, diagnostician, prescriber, and manager of instructional events. Although considerable effort has been devoted to improving the hardware, software, and instructional technology which support CMI systems, the problem of preparing students to utilize their skills effectively and efficiently within this individualized instructional system has received little attention.

It must be assumed, moreover, that until various forms of individualized instruction become common in our public school system, military trainees will find CMI to be an extremely novel learning experience. Few of these trainees will possess the knowledge or skills which enable them to use the capabilities of computer-based systems efficiently. Although there are certainly some basic skills which transfer from one learning environment to another, many trainees will either not have these skills or will not know how to adapt them to computer-managed training. If the CMI systems being designed and built are to be most effective, there is a definite requirement for orienting students to novel system capabilities and equipping them with minimum skills to capitalize on these capabilities.

The following section delineates the specific goals of the CMI Skill Modules Project. This is followed by a summary of the objectives of part of this project, the Student Study Skills Package, and a description of the project context, the Air Force Advanced Instructional System (AIS). Sections 2.0 through 5.0 summarize the issues the package was designed to address, the design and development activities, and the formative and summative evaluation results, respectively. Section 6.0 is a discussion of the results and conclusions. For a complete discussion of each of these areas, the reader is referred to AFHRL Technical Report No. 79-20. Throughout this report, the asterisk (*) is used to denote those areas for which specific data have been omitted from this report but which are available in AFHRL-TR-79-20. Appendices A to G present the Study Skill materials as the final product of this study.

1.1 Project Goals

The overall goals of the CMI Skill Modules Project were to (a) determine the characteristic problems which students encounter in a CMI system and those strategies which effectively help students cope with or adapt to these problems; (b) design, develop, implement, and evaluate a small set of self-contained instructional modules for increasing the effectiveness with which students adapt to and perform in a CMI environ-

8

ment; and (c) investigate procedures for individualizing the assignment of these modules so as to minimize total completion times and training costs.*

The student skill modules developed had the design goal of being short packages which could be assigned near the beginning of an arbitrary technical training course, but which also would incorporate strategies or procedures that would continue to affect student behavior throughout the course (i.e., behavioral self-control strategies). Thus, the rational governing module design was to include those instructional strategies and procedures appropriate not only to the teaching of specific skills, but also to the review and practice of a set of basic skills defined as necessary for effective and efficient student performance in a CMI system.

1.2 Study Skills Package Objectives

The major design goal of the Study Skills Package was reduction of course completion time. That is, the objective of this set of modules was to provide poorly skilled students with appropriate study skills which would improve their performance in the course and reduce the amount of time required to complete. A subsidiary goal was to provide instructors with appropriate pedagogical tools to help them become efficient diagnosticians, tutors, and/or facilitators in the remediation of study skills deficiencies, thereby enabling them to help students become efficient learners. In other words, this set of study skills materials was designed to enhance student study skills and to provide instructors with specific tools which they could use to fulfill their role in a CMI environment.

1.3 Project Context: The Air Force Advanced Instructional System

The context for the CMI Student Skills Modules Project was the AIS located at Lowry AFB. The AIS is a prototype, multimedia, computer-based instructional system designed to improve the effectiveness and efficiency of Air Force technical training and to provide an operational research facility for assessing innovations in instructional technology. The system supports 4 technical training courses representative of the range of cognitive and performance skills required by enlisted Air Force personnel. An adaptive instructional decision model utilizes state-of-the-art computer hardware and software, as well as currently available statistical methodologies and instructional procedures, to provide instructional management and individualized assignments to alternative instructional materials.

1.3.1 AIS Course Structure. Each AIS course is divided into "blocks" of instruction which require from 1 to 15 days to complete. Each block contains a number of lessons and a comprehensive, end-of-block test. Within a block, lessons are arranged in a hierarchy based on their prerequisite relationships. A typical hierarchy resembles a set

of parallel chains converging and diverging on certain pivotal lessons, and a student may alternately work on lessons in 2 or more parallel chains.

The basic unit of instruction is the lesson. Each lesson consists of a set of objectives, 2 or more forms of a criterion test, and typically, a self-test by which the student can evaluate his or her understanding of the lesson before taking the criterion test. A lesson's instruction is provided by one or more modules, each having the same lesson objectives and content. Where 2 or more modules are present, they represent alternative instructional treatments or strategies. Depending on the lesson content, objectives, and nature of the treatment, a module may be a programmed text, an elaborated technical order, or an audio-visual presentation.

2.0 PROBLEM DEFINITION

In order to determine the characteristic problems which students experience in a CMI environment, one-to-one student interviews were conducted by the evaluators at the beginning of the CMI Skill Modules Project. The major product of the results of these interviews was the design, development, and evaluation of the Orientation/Time Management Module (see AFHRL-TR-79-14). A subsidiary product resulted from the observation that students often need assistance in improving their study skills and in adapting these skills to a CMI environment. Thus, a second set of interviews was conducted in order to more fully understand the student study skill problem.

For the sake of efficiency, these interviews were conducted in conjunction with the small group tryouts of the Orientation Module of the Orientation/Time Management Lesson (see AFHRL-TR-79-14). An additional reason for combining these interviews with the small group tryouts was that data could be collected on the interviewees' reactions to the various study skill suggestions contained in the Orientation Module.

2.1 Student Interview Procedures

Students and staff from the Inventory Management (IM) and the Materiel Facilities (MF) courses served as interviewees. Although the students believed they had been selected at random for these interviews, they were actually selected because they were members of one of 4 subgroups termed "Experienced-Good," "Experienced-Poor," "Naive-Good," and "Naive-Poor." "Experienced-Good" students were those who had completed all but 2 blocks of their course, were at least 2 days ahead of their Target Completion Date and had at least an 80 percent grade point average. "Experienced-Poor" students were those who had completed all but 2 blocks of their course, were 2 days or more behind their Target Completion Date, and had a grade point average of less than 60 percent. "Naive-Good" students were those who were still working in the first block of their course and were predicted to complete the course in less than the mean course completion time. "Naive-Poor" students were those who were still working in the first block of their course and were predicted to take longer than the mean course completion time to finish the course. All students were selected on the basis of records maintained by the AIS.

Students who had been eliminated from their course but were still on base awaiting their next assignment were interviewed in the same manner as Experienced students. Instructors and supervisors from both courses were also interviewed using the "experienced student" format. The difference in format between the "experienced" student interview and the "naive" student interview was basically one of specificity versus generality.

Seven students in each of the 4 categories (Experienced-Good, Experienced-Poor, Naive-Good, and Naive-Poor), 2 "eliminees," 8 instruc-

tors, and 4 supervisors were interviewed. Each interview lasted approximately 60 minutes, with about one-quarter of this time being devoted to the interviewee reading the Orientation Module.

2.2 Student Interview Results

The data from current student interviews (not eliminees, instructors, or supervisors) are summarized in Table 1. Briefly, most students believed that their study skills were "about average" although less than half of them used the study assists in the manner for which they were designed. Additionally, most students liked the idea of taking responsibility for their own learning.

Table 2 summarizes the interview data from instructors (n = 9) and supervisors (n = 4). As can be seen by comparing Table 1 with Table 2, students and staff did not always agree on the student study skills problem. A majority of the staff thought that students had poor study skills whereas only a few of the students believed that they had poor study skills. A majority of the staff also believed that students did not know how to take responsibility for their own learning whereas none of the students interviewed indicated that they disliked this aspect of individualized instruction. Additionally, during the course of these interviews, a number of instructors in each course expressed concern that their roles be more explicitly defined and that training be provided for these roles.

In addition to the questions listed in Tables 1 and 2, several open-ended questions were asked of Experienced Students and Staff Personnel. One of these questions asked the interviewees to describe the biggest problem students had in their course. Although many different answers were received, many students and staff personnel cited study skills, specifically reading comprehension, and the lack of self-discipline as major problems for all students.

With respect to students eliminated from their course, it must be noted that the n is very small (n = 2) because of the difficulty in locating such individuals. Briefly, students who were eliminated from their courses expressed no negative feelings toward school in general and believed that their study skills were either fair or good when compared to their peers. Neither of the eliminees had ever taken an individualized course before this one, but both liked the idea of taking responsibility for their own learning. One of the eliminees believed that "boredom" was the biggest problem that students had with the course whereas the other believed that the biggest student problem was feeling rushed.

The following conclusions were drawn from these interviews:

1. Although most students like the idea of taking responsibility for their own learning, most are generally not prepared to handle the

12

TABLE 1

Student Opinions of Their Study Skills

QUESTIONS	STUDENT RESPONSES
1. How do you feel about being back in school/about school in general?	Naive-Good students had the lowest opinion of school; Naive-Poor students had the highest opinion. Good students had a lower opinion of school than did Poor students and Naive students had a slightly better opinion of school than did Experienced students.
2. How would you rate your study skills?	A majority of both Good and Poor students rated their study skills as average. About one-fifth of the Good students and also of the Poor students rated their study skills as good. Several of the Poor students, but none of the Good students, rated their study skills as poor.
3. Have you ever had an individualized course before this one and if so, what was your opinion of this experience?	Four of the 14 Good students had previous experience with individualization, whereas only 1 of the 14 Poor students had this type of experience. All of the students who reported prior individualization experience rated it positively.
4. How do you feel about taking re-sponsibility for your own learning?	A majority of all students liked this feature; less than one-fifth were ambivalent; and none reported a dislike of this individualization characteristic.
*5. How would you feel if grades were eliminated and the course were merely pass/fail?	A majority of the Experienced-Poor students and all of the Experienced-Good students from the IM school indicated that they would dislike such a change, whereas both of the Experienced-Good students from the MF school thought they would like a pass/fail system.
*6. Do you plan your study time?	A majority of the Experienced-Good students reportedly planned their study time, whereas less than half of the Experienced-Poor students did this.
*7. Do you use the objectives and the embedded questions?	All of the Experienced students indicated that they used the objectives and the embedded questions.
*8. Do you use them the way the text suggests?	Less than half of the Experienced-Good students and less than one-third of the Experienced-Poor students reportedly used the objectives and embedded questions in the manner suggested by the text.
*9. How do you feel about the method the text suggests?	A majority of all Experienced students liked the method the text suggested.

* Naive students were not asked questions 5 through 9.

13

TABLE 2

Staff Opinions of Student Study Skills

QUESTIONS	STAFF (INSTRUCTORS AND SUPERVISORS) RESPONSES
1. How do students feel about being back in school?	A majority of the staff believed that students either liked being back in school or were ambivalent about this situation.
2. What kind of study habits do students have?	A majority of the staff indicated that most students have poor study habits.
3. About how many students have had experience with individualized instruction before coming to this course?	A majority of the staff indicated that, for most students, this CMI course is their first experience with individualized instruction.
4. How do students feel about taking responsibility for their own learning?	A majority of the staff stated that most students either do not know how or do not want to take responsibility for their own learning.
5. How would you feel if grades were eliminated and the course were merely pass/fail?	Slightly less than half the instructors felt that changing the course to a pass/fail system would be desirable. None of the supervisors agreed with this opinion although a majority of them were ambivalent on this subject. Slightly less than half the instructors felt that such a change would be undesirable.
6. Do students plan their study time?	Two-thirds of the instructors believed that students do not plan their study time, whereas a majority of the supervisors believed that students "sometimes" plan their study time.
7. Do students use the objectives and the embedded questions?	A majority of the instructors thought that students "sometimes" use the objectives and the embedded questions. Supervisors were evenly divided between "usually" and "sometimes."
8. Do they use them the way the text suggests?	A majority of the instructors thought students "sometimes" used the objectives and embedded questions the way the text suggested but supervisors were evenly divided between "sometimes" and "rarely."
9. How do you feel about the method the text suggests?	A majority of the staff liked the text's suggested method for using objectives and embedded questions.

14

responsibilities of individualized instruction; hence, there is a need for some type of remedial training in study skills and self-discipline.

2. Due to both the expressed need for definition of CMI instructor roles and student remediation in the study skills area, it appears that instructors would benefit from some training in not only specific study skills but also in general listening and counseling skills.

3. The study skills areas which seem most appropriate and useful for this environment are reading comprehension and some form of concentration or self-management. Other areas which might be useful could be test-taking skills and the use of mnemonics.

3.0 STUDY SKILLS PACKAGE DESIGN AND DEVELOPMENT

The Study Skills Package was designed to address the conclusions drawn from the student and staff interviews. Thus, this package consists of 4 separate and consumable study skill modules, a Study Skills Questionnaire, and an Instructor Orientation and Training Workshop.

3.1 Package Design

3.1.1 Module Design. The 4 study skills areas which were isolated as being the most useful for students were (a) Reading Comprehension, (b) Memorization, (c) Concentration Management, and (d) Test Taking. A set of materials was written for each of these areas and packaged individually, so that a student could receive any or all of the packages as deemed necessary by an instructor. The decision to make the modules consumable was based on the idea that students often need to return to unfamiliar material to freshen their memories and to clarify confusing or difficult areas. Furthermore, since the use of good study skills is an on-going requirement in the course, it was judged desirable to give students a set of materials to which they could refer whenever necessary.

3.1.2 Study Skills Questionnaire Design. In order to assist instructors in identifying students in need of such remediation and to evaluate the effectiveness of the remediation, a Study Skills Questionnaire was used to assess each student's opinion of his/her study skills in each of the 4 areas (Reading Comprehension, Memorization, Concentration Management, and Test Taking). The original questionnaire contained 50 questions: 15 in the Reading Comprehension area, 12 in the Memorization area, 11 in the Test Taking area, and 12 in the Concentration Management area.

3.1.3 Instructor Orientation and Training Design. The Instructor Orientation and Training Workshop had 3 main objectives: (a) To familiarize instructors with the strategies, techniques, and objectives of the study skill materials; (b) to provide instructors practice with these techniques; and (c) to provide instructors with appropriate counseling and tutorial skills. This third objective was deemed important as one of the major responsibilities of a CMI instructor is considered to be providing individual counseling for students with special learning problems. More specifically, this counseling role requires instructor skills in identifying students with problems, diagnosing the particular areas of weakness for these students, and providing appropriate tutorial assistance or other remediation.

3.2 Evaluation Instruments

As was mentioned previously, the Study Skills Questionnaire was designed to perform as both a diagnostic measure and an evaluation measure of the 4 Study Skills Modules. For this reason, all students were to be

given the Study Skills Questionnaire after completing the first block of the course and before beginning the last block of the course. The results of the first administration would provide a pre-intervention measure and diagnostic information for instructors as to the type of remediation that would be most appropriate for a particular student. The results of the second administration would provide a postintervention measure which, when combined with information on student performance in the course, could be used to evaluate the effectiveness of the Study Skills Modules. The decision to place the questionnaire after the first block instead of before it was based on the belief that students would have a more realistic perception of their study skills after, rather than before, they had some experience in a CMI environment.

A second measure employed to evaluate the effectiveness of the Study Skills Modules was student performance. That is, test grades and time-to-complete data, collected by the AIS system, were used to determine if these modules did, in fact, increase student study skills. Thus, the first measure evaluated self-perception and affective variables, whereas the second measure evaluated actual performance.

3.3 Instructional Strategies and Procedures

In the study skills area, requirements for implementing the 4 Study Skills Modules included provisions for assigning any one of the modules, at any point in the course, to students designated as having deficiencies in one or more of the skill areas. Additionally, it was desirable that (a) the time spent working on the study skills materials not count against the student if the materials were assigned during the regular training shift and (b) the materials could be assigned as homework.

Finally, in the instructor training area, support requirements included providing for implementation of the Study Skills Questionnaire at the end of the first and next-to-last blocks of the course and making student scores on the questionnaire available to instructors for diagnostic, counseling and remediation purposes.

With the exception of instructor retrieval of student questionnaire scores, mechanisms were already available within the flexible AIS data base structure to meet all of these requirements. The Study Skills Modules were assigned by instructor override to the specific module selected for a student. The questionnaires to be administered before and after study skills remediation were defined to, assigned by, and scored by existing data base structures. Minor software changes were made so as to provide instructors with interactive terminal access to students' total and subscale scores on the Study Skills Questionnaire.

To begin this program, the Study Skills Package (remediation modules, questionnaire, and instructor training) was described to instructors and supervisors during an informal briefing at each of the 4 AIS courses. At that time, the instructors who were interested in par-

ticipating in the program were asked to sign a volunteer form detailing their name, rank, course and work shift. It was stressed that this program was brought to fruition by their suggestions and comments and that in this, the evaluation stage, the program was strictly voluntary. Thus, only those instructors who were interested in study skills remediation would be trained in the workshops and have access to the materials. Additionally, it was decided to restrict this portion of the evaluation to only those instructors who volunteered to participate, as it was felt that this evaluation should focus on the effectiveness of the materials with minimal interference resulting from lack of instructor motivation. Instructors were to be assigned to the workshops based on their work shift.

The Instructor Workshops consisted of 3 2-hour sessions. The first session was devoted to explaining, discussing, and practicing the use of the study techniques described in the Study Skills Modules. The second focused on problem solving skills, diagnostic strategies, and remediation procedures, including some training in listening and probing skills. These 2 sessions were held on consecutive days, and the third session was held approximately 1 week later. This third session was designed to give instructors a chance to discuss any problems or difficulties they had experienced in using the materials and procedures in their classrooms, to exchange information, solutions, and suggestions, and to present appropriate case histories.

After the second session of the Instructor Workshop, it was the instructor's responsibility to decide which students would be assigned 1 or more Study Skills Modules. That is, after participating in the workshop, instructors were to combine their new information with the knowledge they already possessed about student and course problems and solutions to identify students who could benefit from study skills remediation. When an instructor identified a student who was behind schedule or who had failed a block test, the instructor was to determine if the student's problem was related to poor study skills and then decide, if it was a study skill problem, what specific type of remediation would be appropriate. Although these decisions could have been determined statistically, by other personnel, or even by the students themselves, it was hypothesized that giving instructors this responsibility was vital to the development of appropriate instructor roles. Instructors could then have more control over the variable by which they were often evaluated, namely student performance. An instructor critique form was designed to assess instructors' reactions to and comments about the workshops. This critique form contained 19 forced-choice ratings and 1 open-ended question.

4.0 FORMATIVE EVALUATION

Formative evaluation activities for the Study Skills Modules and the Instructor Orientation and Training Workshops were conducted in 2 phases. The first phase was a small group tryout wherein the primary concern was whether or not the modules or workshops accurately and efficiently conveyed the desired information. The second phase was an operational tryout during which the primary consideration was what effect the modules or workshops had upon student and instructor performance.

Formative evaluation activities of the Study Skills Questionnaire was also conducted in 2 phases. During the small group tryout, the primary concern was whether or not the questions were relevant to the AIS environment. During the operational tryout, the main question was whether the initial 50-item questionnaire demonstrated sufficient total scale and subscale reliability.

4.1 Study Skills Modules

4.1.1 Small Group Tryouts. The subjects for the small group tryouts of the Study Skills Modules and Questionnaire were instructors, rather than students, from the 4 AIS courses. There were 3 main reasons for this procedure. First, it was hypothesized that if instructors were included in the formative evaluation of this package, they would be more accepting of it during subsequent evaluations. Such acceptance was deemed highly desirable due to the substantial instructor resistance experienced during evaluation of the Orientation/Time Management Module. Second, since training in study skill techniques was to be an integral part of the Instructor Orientation and Training, it was thought that instructor participation would be greater if their comments and suggestions were given value. Finally, much of the material used in these modules had already been subjected to student evaluations by other researchers (e.g., Dansereau, in press; Weinstein, 1977; Woodley, 1973).

The procedures, then, included having the experimenters visit each AIS school and brief the instructors on the Study Skills Package. Instructor volunteers were asked to read and complete a 12-item questionnaire on any 1 of the 4 modules. A list was also circulated for interested instructors to sign up for participation in the subsequent Instructor Workshops.

The experimenters returned to the schools a week later to collect the questionnaires and instructor comments, and to discuss any questions or problems the instructors had with the Study Skills Package. At this time, a second list was also circulated for instructors to volunteer for the Instructor Workshops. Although approximately 4 copies of each module were distributed at each school, many instructors did not want to complete the questionnaire. Hence, the Test Wiseness Module was officially reviewed by 7 instructors, the Memorization Module by 6 instructors and the Concentration Management and Reading Comprehension

19

Modules by 5 instructors each.

The results of these questionnaires are shown in Table 3. Generally, the instructors liked the modules and believed that they would be useful to at least some of their students. Some believed, however, that the modules were written at too difficult a level for most students and, therefore, needed to be revised.

Revisions made to the 4 modules included printing the text on both sides of the page, defining difficult words, and generally lowering the reading level of the material. Material that was deemed unnecessary was eliminated and some material that was deemed particularly important was highlighted. A section on Slow Deep Breathing, as a method of maintaining a relaxed yet alert study mood, was added to the Concentration Management Module and several of the self-test questions in the Test-Wiseness Module were rewritten.

To clarify the 3 study methods in the Reading Comprehension Module, a table of contents was added to the beginning of this module. Additionally, the worksheets, which are part of the third reading method discussed, were moved from the main body of the text to an appendix. The Memorization Module was completely rewritten, examples were changed and made more relevant to the military environment, and the order in which the 3 memorization methods were presented was altered.

4.1.2 Operational Tryouts. Instructor Orientation and Training was conducted prior to the operational tryouts of the Study Skills Modules and Questionnaire in order to insure that (a) only those instructors who were committed to the utility of study skills remediation participated in this evaluation and (b) those same instructors were adequately trained to use the study skill materials appropriately. Given that instructor volunteers for these workshops were obtained only from operational AIS blocks in the IM, MF, and WM courses, operational tryouts of the Study Skills Modules were restricted to these courses. (The instructor volunteers from the PME course happened to be from non-AIS course blocks.) The operational evaluation period was approximately 10 weeks, during which time the instructors identified students in their respective courses in need of 1 or more of the Study Skill Modules and assigned them to these modules during the regular shift or assigned the module(s) as homework. Assignment of the modules was such that the time to take them did not count against the student's course completion time. This was done to avoid students' perceiving any negative consequences being associated with the Study Skills Modules since these modules were used in conjunction with the existing Progress Management Component.*

The questions of primary interest during this operational tryout were whether those students who received 1 or more of the Study Skills Modules would (a) increase their scores on the Study Skills Questionnaire from the initial to end-of-course measurement periods and (b)

20

TABLE 3

INSTRUCTOR OPINIONS OF THE INITIAL STUDY SKILLS MODULES

QUESTIONS	RESPONSES
1. Would cartoons or visuals improve this module?	A majority of instructors reading each module were neutral on this question.
2. Does the information in this module make sense to you, i.e., do you think that what it instructs students to do would help them be better students?	All of the instructors reviewing the Reading Comprehension Module answered this question positively. A majority of instructors reviewing the other modules answered this question positively.
3. Do you think the material was clearly presented?	A majority of the instructors reviewing the Reading Comprehension Module were neutral on this question, whereas a majority of the instructors reviewing the other modules answered this question positively.
4. Would you assign this lesson to students who needed this type of remediation?	A majority of the instructors reviewing the Test-Wiseness Module answered this question positively, whereas a majority of the instructors reviewing the other modules were neutral on this question.
5. Was the material in this module too difficult for the average student?	A majority of the instructors reading each module were neutral on this question.
6. Do you think a student should take this module alone or should an instructor tutor the student?	A majority of the instructors reviewing the Reading Comprehension Module thought that the student should have a tutor. A majority of the instructors reviewing the other modules thought the student could take the module by him/herself. Numerous instructors indicated that this decision should be based on the skills and abilities of the particular student.
7. How difficult do you think it would be for you to learn the material in this module well enough to tutor students?	Instructors reading the Concentration Management Module were evenly divided between the response categories "not at all" and "not sure." A majority of the instructors reading the other 3 modules felt that this would be "not at all" difficult.
8. How many students in your present learning center would benefit from taking this module?	A majority of the instructors indicated that at least half of their present students would benefit from the module they had reviewed.
9. Would you like to participate in the evaluation of the Study Skills Modules?	A majority of all instructors were neutral on this question.
10. What changes do you think need to be made to this module?	Comments generally focused on the excessive length of the Reading Comprehension Module or the lack of technical examples in the Memorization Module. Other comments centered around the appropriateness of teaching students how to take a test and the necessity of defining new words.

21

improve their course performance (either times-to-complete or scores) following remedial study skills training. A question of tangential interest was the number of students per course the instructor volunteers would identify as having study skills problems and would remedy via the appropriate study skills module(s).

Instructors were given access to a special AIS interactive program which would, when given a student's Social Security Number, display the student's Study Skills Questionnaire scores. A handout explaining how to interpret the study skill scores, as well as including some suggested cut-off scores, was distributed to all instructors participating in the study.

The results of the operational tryout of the Study Skills Modules are first described with respect to the number of students in the IM, MF, and WM courses who were identified for and received one or more of the modules during the evaluation period. These data are shown in Table 4, which reports (a) the total number of students who took 1 or more Study Skills Modules; (b) the subset of these students with complete performance data for analysis in the evaluation time period; (c) the number of students who were assigned 1 or more Study Skills Modules and were still in the WM course (a longer course than the other two; thus, not all students of interest completed the course by the end of the evaluation period); and (d) those students who were assigned 1 or more Study Skills Modules, were still in the WM course, and had adequate post-course Study Skills Modules performance data for analysis. It should be noted that these data do not reflect a complete picture of the extent to which the instructors who participated in the workshops assigned these study skills materials. It was learned from the instructors and data clerks in the three courses that a number of instructors had picked up materials for assignment to students, but had not identified the students to the AIS data base. A conservative estimate of the students not accounted for is 10 in the IM course, 5 in the MF course, and 25 in the WM course.

TABLE 4

Number of Students Receiving Study
Skills Materials During Operational Tryouts

COURSE	TOTAL STUDENTS WHO COMPLETED THE COURSE	STUDENTS WITH COMPLETE PERFORMANCE DATA	TOTAL WM STUDENTS STILL IN COURSE	STUDENTS WITH COMPLETE PERFORMANCE DATA
IM	7	5		
MF	2	0		
WM	2	1	10	5

Given the small number of students per course with sufficient per-
formance data for analysis, Table 5 reports before and after data for
block and time scores for individual students. Furthermore, due to
variability in both the lengths of the individual course blocks and the
difficulty of the individual end-of-block tests, students' raw time and
score values had to be translated into standard scores so as to make
them comparable across successive blocks. Thus, each student's block
times and block scores for the pretreatment time period (prior to being
assigned Study Skills Module(s)) and posttreatment time period
(after being assigned Study Skill Module(s)) are reported in terms of
how their performance compares to all other students in the course.
For example, IM student #1 had a before treatment block score of 1.12
standard deviations below the mean and an after treatment block score of
.13 standard deviations below the mean. Table 3 also indicates, by
student, the particular Study Skills Module(s) which were assigned,
reports course average before/after standard scores, and presents the
overall average standard score for the 11 students in question in terms
of both block time and block score.

As can be seen in Table 5, all 5 IM students improved their block
times (a reduction in the standard score values) from before to after
study skills remediation. Similarly, 4 of the 6 WM students improved
their block times from before- to after-study skills remediation. The
overall average for the 11 students in question was a 2.54 before-
treatment score and a 1.27 after-treatment score; a decrease in course
completion time of more than 1 standard deviation.

Block score changes for students in the IM course indicate that all
5 IM students improved (an increase in standard scores) their block score
performance following study skills remediation. The average improvement
for IM students was from -1.45 to -.34. All 5 WM students with before/
after block scores also improved their performance following study skills
remediation, with the average change being from -.93 to .41. The overall
improvement in student block scores across the IM and WM courses was from
-1.19 to .03--again in excess of 1 standard deviation.

Of those student samples enumerated in Table 5, only 2 IM students
had data on both the initial and end-of-course administrations of the
Study Skills Questionnaire. The data for these students on the total
scale (SSQUES) and 4 subscales (READCM, MEMORY, TSTTAK, CONMGT) are shown
in Table 6, along with a listing of the particular Study Skills Modules
these students were assigned during the course. It is of interest to
note that the student who received all 4 modules demonstrated the great-
est improvement in his assessment of his study skills, whereas there was
little change in the ratings of the student who received only the Reading
Comprehension module.

Finally, it was of interest to examine the time spent on each of
the Study Skills Modules. Given that, of the 11 students in the IM and

23

TABLE 5
Standardized Before/After Study Skills Remediation
Block Times and Scores for IM and WM Students

Course/ Student	Pretreatment Score	Posttreatment Score	Modules Taken*
Block Time			
IM-1	1.77	1.57	RC, M, CM
IM-2	1.94	.09	RC, M, CM
IM-3	2.75	.89	RC
IM-4	5.45	2.00	RC, M, TT, CM
IM-5	2.40	1.96	TT
IM Average	2.86	1.30	
WM-1	2.48	-.04	RC, M, TT, CM
WM-2	2.34	1.40	RC, M, TT, CM
WM-3	1.89	1.22	RC, M, TT, CM
WM-4	4.51	2.60	RC, M, TT, CM
WM-5	.71	1.42	RC
WM-6	1.30	1.63	RC
WM Average	2.21	1.24	
Overall Average	2.54	1.27	
Block Score			
IM-1	-1.12	-.13	RC, M, CM
IM-2	-1.14	-.59	RC, M, CM
IM-3	-1.88	-.93	RC
IM-4	-2.24	-.29	RC, M, TT, CM
IM-5	-.89	.25	TT
IM Average	-1.45	-.34	
**WM-1			
WM-2	-1.82	.95	RC, M, TT, CM
WM-3	-.11	.30	RC, M, TT, CM
WM-4	-2.43	-.32	RC, M, TT, CM
WM-5	-.20	.51	RC
WM-6	-.10	.61	RC
WM Average	-.93	.41	
Overall Average	-1.19	.03	

* RC = Reading Comprehension; M = Memorization; TT = Test Taking;
   CM = Concentration Management
** No Before/After Score Data Available

WM courses with data available for analysis, only 3 IM and 1 WM student read their module(s) during the training shift, it is only possible to suggest the time spent on the modules. Of the 3 IM students, times were available on the Reading Comprehension Module only, and these times-to-complete were 81, 109, and 86 minutes--a mean of 92 minutes. The WM student took 275 minutes to complete all 4 Study Skills Modules. The significant aspect of these data is that the time spent on study skills remediation was not excessively long, suggesting that the time required for such remediation compares favorably with the resulting performance gains.

4.2 Study Skills Questionnaire

4.2.1 Small Group Tryouts. Like the small group tryouts of the Study Skills Modules, the small group tryouts of the Study Skills Questionnaire consisted of a review of the materials by instructors. The results of this review indicated that instructors were generally satisfied with the content and format of the questionnaire but believed that some of the questions were too sophisticated for the average student. Thus, these questions were rewritten.

TABLE 6

Changes in Student Scores on
Initial and End-of-Course Study Skills
Questionnaire Administrations

COURSE/ STUDENT	SCALE	INITIAL SCORE	END SCORE	MODULE(S) TAKEN
IM-1	SSQUES	69	70	Reading
	READCM	19	21	Comprehension
	MEMORY	18	17	
	TSTTAK	12	15	
	CONMGT	20	17	
IM-2	SSQUES	52	68	All 4 Modules
	READCM	24	21	
	MEMORY	10	20	
	TSTTAK	02	16	
	CONMGT	16	11	

4.2.2 Operational Group Tryouts. The questionnaire was then evaluated in an operational tryout and as such was administered to all students in the IM, MF, WM, and PME courses as they began the second block of their CMI course and again as they began the last block of their course. This procedure was followed for approximately 3 weeks. The question of primary interest in these tryouts was whether this initial

50-item questionnaire demonstrated sufficient total scale and subscale reliability. Thus, Cronbach's alpha reliability coefficient was calculated on each course's pre-course and post-course questionnaire data via the AIS Test Item Evaluation (TIE) program.* The results of these analyses resulted in the deletion of 20 items from the questionnaire. Eight items were retained in the Reading Comprehension subscale, 7 items in the Memorization subscale, 6 items in the Test Taking subscale, and 9 items in the Concentration Management subscale (see Appendices E and F for a copy of the original 50-item questionnaire and the revised 30-item Study Skills Questionnaire).

4.3 Instructor Orientation and Training

4.3.1 Small Group Tryouts. Four instructors from the MF course and 4 from the WM course participated in the small group tryouts for the Instructor Orientation and Training. The first session, which lasted approximately 90 minutes, focused on the Study Skills Modules and practice of the techniques described therein. The second session, which lasted approximately 120 minutes, focused on the practice of problem solving, diagnosing, counseling, and remediation skills, as well as the use of the Study Skills Questionnaire. The third session, which was held a week after the second session, lasted approximately 60 minutes and provided an opportunity for the instructors to evaluate the workshops via a forced-choice critique form (see Table 7) and to discuss their experiences in using the Study Skills materials in the classroom.

The critique results of the small group tryouts, shown as the number of instructors responding to each category, are presented in Table 5. Basically, the instructors were fairly satisfied with the general composition and format of the workshops. Those activities which were most popular were the explanations of the questioning technique in the Reading Comprehension Module, the self-talk principles, the use of mental imagery as a type of memory aid, and the diagnostic question handouts and explanations. Other activities rated highly were the exercise in listing internal and external clues to student study skill problems, the examples of when communication problems occur, the passage on Attending Behavior, and the discussion of reflection and probing skills.

Additional favorable information was obtained from the case histories and experiential evidence which instructors brought to the third session of the workshop. The few students who had been assigned any of the Study Skills Modules between the second and third sessions of the workshop seemed to show dramatic improvement in their course performance. In general, the instructors thought that these modules were definitely providing the type of remediation that the slower students needed.

Based on these findings, the Instructor Orientation and Training Workshop was modified slightly, such that some examples were made more relevant and participative discussion was emphasized. Additionally, even

26

TABLE 7

INSTRUCTOR CRITIQUE OF WORKSHOPS
SMALL GROUP TRYOUTS*

DIRECTIONS: Please check the space below which most nearly indicates how you felt about the instructor workshop as described by each question.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. I felt that the first session on the study skills techniques was useful to me.	3	3	1	0	0
2. I felt that more time should have been spent going over the techniques in each study skills lesson.	0	4	3	0	0
3. I felt that the second session on diagnostic skills and techniques was useful to me.	2	4	1	0	0
4. I would like to have spent more time on listening and probing skills.	14	0	3	3	0
5. The workshop sessions kept my interest.	2	4	0	0	0

In the spaces below, please check those activities which you particularly liked and those activities which you particularly disliked.

	Particularly Liked	Particularly Disliked
Session 1		
6. Explanation of Questioning Technique in Reading Comprehension Module.	7	0
7. Explanation of Networking Technique in Reading Comprehension Module.	3	3
8. Self-Test xercise for Test-taking skills lesson.	4	2
9. Slow Deep Breathing Exercise.	4	3
10. Explanation of Self-talk Principles.	6	0
11. Explanation of Elaboration-type of Memory Aid (Mnemonic).	2	1

TABLE 7 (Concluded)

INSTRUCTOR CRITIQUE OF WORKSHOPS
Page 2

		Particularly Liked	Particularly Disliked
12.	Explanation of Mental Imagery as type of Memory Aid.	6	0
13.	Explanation of Grouping as type of Memory Aid.	4	1

Session 2

		Particularly Liked	Particularly Disliked
14.	Exercise in List of Clues (Internal and External) to Student Study Skills Problems.	5	1
15.	Example of when communication problems occur.	5	0
16.	Passage on Attending Behavior.	5	1
17.	Discussion of Reflection and Probing Skills.	5	0
18.	Diagnostic Question Handouts and explanation.	6	0
19.	Use of Student/Instructor scripts.	2	3

20. Comments:

* Numbers shown here are the number of instructors responding to each category.

though several instructors disliked the Slow Deep Breathing exercise, it was retained because the Workshops were designed to provide instructors with practice in the techniques they were going to show students or have students do. It was deemed particularly important for instructors to understand how this technique worked, even though, in the initial stages of instruction, it might be somewhat embarrassing for instructors to close their eyes and concentrate on their breathing in a group setting.

    4.3.2 <u>Operational Tryouts.</u> The operational tryouts of the Instructor Orientation and Training Workshops were conducted 2 weeks after the small group tryouts and, as was noted earlier, before the operational tryouts of the Study Skills Modules and Questionnaire. Initially, 47 instructors volunteered to participate in the workshops and thus, 4 sections were created, with 11 instructors assigned to each section. Unfortunately, due to summer leave and various job responsibilities, only half of these individuals actually participated: 8 instructors each from the PME and IM courses, and 7 instructors from the WM course.

5.0 SUMMATIVE EVALUATION

For the purposes of this project, summative evaluation was considered to be a second large-scale tryout in which data were collected for approximately 50 students per treatment. Given time and resource constraints, it was necessary to restrict full summative evaluations to the Study Skills Questionnaire. Evaluation of the Study Skills Modules and the Instructor Orientation and Training Workshops was, therefore, restricted to the formative evaluation activities described in Sections 4.1 and 4.3 of this report. The summative evaluation procedures employed and results obtained for the Study Skills Questionnaire are described in the following sections.

The 2 questions of primary interest in the summative evaluation of the Study Skills Questionnaire were (a) whether the questionnaire demonstrated satisfactory reliability, as defined by an internal consistency measure and (b) whether it demonstrated acceptable validity, in both a construct and predictive sense. The revised 30-item questionnaire was, therefore, implemented in all 4 AIS courses for about 9 weeks. As was noted earlier, the Study Skills Questionnaire data were also utilized in the evaluation of the Study Skills Modules, thus necessitating a pre-post implementation design. For the purposes of validating the questionnaire, however, data from the initial administration (i.e., end of first course block) are most relevant since the questionnaire was intended primarily as a diagnostic precourse or pretreatment self-appraisal of student study skills. Therefore, data on the questionnaire administered to AIS students at the end of their first course block were utilized to determine the reliability and validity of the Study Skills Questionnaire.

The analysis results with respect to the use of the Study Skills Questionnaire as a diagnostic tool for helping to identify those students in need of study skills remediation were quite promising. Not only were the Questionnaire and its subscales found to demonstrate good reliability and construct validity, but the results of the predictive validity analyses indicated that this test can reliably discriminate those students who will perform satisfactorily versus poorly in a CMI environment such as the AIS. Furthermore, the Questionnaire reliably discriminated between the groups for block times and scores, as well as lesson times and scores, suggesting the sensitivity of the Questionnaire to different CMI criterion variables. Another finding of importance was that the ability of the Questionnaire to predict performance did not decrease from early to late blocks of either the IM or WM courses.*

30

6.0 DISCUSSION AND CONCLUSIONS

6.1 Study Skills Modules

Although the data from the evaluation of the Study Skills Modules are limited with respect to number of samples, the findings of dramatic student improvement in block times and scores following study skills remediation are so consistent that it appears certain this training met the goal of increasing student efficiency and effectiveness in a CMI training environment. There was also a suggestion that providing students with this training improved their perceptions of their study skills, particularly when it involves more than one module.

Two major implications of the study skills training results are that this relatively short training (a) continues to effect an improvement in student performance throughout the course and (b) appears to have its most dramatic effect on the performance of students who were assigned all 4 of the Study Skills Modules. The first of these phenomena would be expected on the basis of the strategies used to modify student study behaviors, i.e., active information processing strategies and cognitive self-control strategies. Since emphasis is placed on active and meaningful information processing, the continuing practice itself, and its immediate resultant reinforcement, would tend to maintain and strengthen the desired behaviors over time. Similarly, it would be expected that the cognitive self-control strategies, such as the positive self-talk scenarios used in the Concentration Management and Test Taking Modules, would become habitual with practice.

The fact that students assigned all 4 Study Skills Modules tended to improve their performance to a greater extent than did those receiving only 1 module (particularly if the 1 module was Reading Comprehension) may well have been due to the sheer volume of the study skill training. It could also be attributable to inappropriate instructor matches of a single module of learning materials with the needs of a particular student, or it could be due to some common characteristic that causes certain students to be selected for study skills remediation. With respect to the latter point, it may be that the selected students had other aptitude or motivational characteristics that differentially moderated the effects of the study skills training. This suggests that an individualized study skills assignment procedure which employs student characteristic data in assisting instructors to make diagnostic decisions would further improve the effectiveness of study skills training.

These data point to the following conclusions:

1. Providing students with specific study skills remediation which capitalizes on their active information processing strategies and/or provides students with methods for controlling dysfunctional behavior is very feasible and promises to be highly cost-effective in terms of improved training effectiveness and efficiency;

31

2.   Further enhancements to the effectiveness of such study skills
training would be expected from efforts to refine the identification of
students in need of such training, including expanded instructor training
programs and computer-based individualization decision models.

6.2   Study Skills Questionnaire

The results of the Study Skills Questionnaire analyses indicated
that this measure was highly reliable and able to accurately and consis-
tently predict whether or not students would perform poorly in their
course. A tangential issue developing from these results was a compar-
ison of the predictive power of the Questionnaire with the predictive
power of the preassessment tests, which all students in the AIS complete
prior to entering their courses. Although the preassessment variable
sets available in the AIS environment were more effective than the
Questionnaire variables in discriminating those students who perform
satisfactorily versus poorly with respect to completion times and
criterion test scores, there are a number of issues related to the oper-
ational application of the Study Skills Questionnaire in a CMI environ-
ment that should be addressed.

First, for those CMI environments which do not support preassessment
testing or the use of precourse student data in performance predictions,
it may be more efficient to simply implement the Questionnaire for pre-
dictive and diagnostic purposes, rather than designing and implementing
some type of precourse assessment procedure. The second issue is related
to the intended use of the Study Skills Questionnaire in a CMI environ-
ment as a prescriptive and/or diagnostic tool. On the basis of the
present findings, it would appear that the Questionnaire could at least
be used to supplement the prediction of student performance. It serves
a highly useful function in the diagnosis of particular student study
skill weaknesses, and thus facilitates the instructor's remediation
decisions.

A final issue concerns the use of the Questionnaire in the diagnosis
of particular study skill weaknesses. Some course personnel have
suggested that it might be more efficient to simply administer all 4
Study Skills Modules to students predicted to have trouble satisfactorily
performing in a CMI course, rather than using the Questionnaire to
select particular Study Skills Modules for particular student needs.
Related to this issue is the question of how useful it may be to give
instructors a more expanded role in using the Questionnaire data to make
refined diagnostic and remedial decisions. All of these issues, then,
are important considerations in arriving at recommendations regarding
how the Study Skills Questionnaire should be used in various CMI environ-
ments.

The results of the Questionnaire data analysis permits the following
conclusions to be made:

1. A self-report rating of student study skills in areas identified as important in a CMI environment (reading comprehension, memorization, test taking, concentration management) is both a highly reliable and valid method of assessing areas of student strengths and weaknesses. The fidelity of this measure might be further enhanced by incorporating instructions which stress the importance of truthful answers.

2. The Study Skills Questionnaire in its present form has sufficient predictive validity to be of use to CMI instructors in the diagnosis of those students expected to have difficulty completing their course efficiently and effectively. Additional analyses would be required to provide instructors with the specific cut-off scores on each of the questionnaire's subscales that would indicate student need for a particular Study Skills Module.

3. The Study Skills Questionnaire could be used as a reliable diagnostic and/or prescriptive tool in lieu of a battery of precourse assessment procedures or as a supplement to these procedures.

6.3 Instructor Orientation and Training

Data for evaluation of the Instructor Orientation and Training Workshops were provided both by the instructor critiques of the workshop training content and procedures and by instructors' subsequent use of their new skills in assigning students to particular study skills materials. With respect to the critique data, instructor comments from both the small group and operational tryouts of the workshops were generally very favorable. Examination of the number of students per course who were assigned some type of study skills remediation, and the performance of these students following this remediation was complicated by the fact that 18 of the 27 instructors who participated in the workshop tryouts had subsequent changes in their work assignments. This prevented them from assigning study skills materials to students and thus, there were only 9 instructors (3 from IM, 1 from MF, 5 from WM, and none from PME) who were in a position to assign the Study Skills Modules. These instructors assigned an average of 2.3 modules to students in their course during the evaluation time period.

As was pointed out in Section 4.1.2, these data are probably misleading, because discussions with instructors and data clerks in these courses indicated that substantially more materials were assigned to students but were not recorded in the AIS data base. It would appear that the Instructor Orientation and Training Workshops were at least moderately successful in promoting the remediation of student study skill problems--a finding further substantiated by the consistent improvements in student block times and scores following this remediation.

Another indication that the Instructor Workshops were successful is reflected in the ancedotal data obtained from informal conversations with individual instructors. That is, with few exceptions, the instructors

33

who participated in the program indicated that, although they were skeptical at the beginning, their experience with the materials led them to believe that students assigned the modules generally showed dramatic improvement in course performance. Many of them, moreover, believed that the Study Skills Questionnaire and the 4 modules should be assigned to all students at the beginning of their course. Such a decision must be made by the management of each course, but it is encouraging to note that the instructors who used the Study Skills materials have faith in the ability of these materials to teach students new, more efficient and effective behaviors. In addition, ancedotal information indicated that instructors were enthusiastic about their new role. They returned to their respective courses and told other instructors about the workshops, and at present, several of the courses are attempting to schedule additional sessions of these workshops. Instructors who participated in the workshops indicated that this type of training was important for satisfactory implementation of the CMI system in their courses. Instructors explained that the workshops showed them how to adapt their skills to the CMI requirements.

The following conclusions can be drawn in this area, based both on the results of the formative evaluation of the Instructor Workshops and on the results of the Study Skills Modules evaluation:

1. A definite requirement exists in CMI environments to provide instructors with the skill training required to effectively and efficiently perform as facilitators of the learning process. Such training can be feasibly and effectively accomplished in a workshop format which includes participative discussions and practice of new skills.

2. The training of instructors in those diagnostic and tutorial skills required to effectively remedy student study skills problems is feasible and can be accomplished efficiently. Further enhancements to such training might include continued instructor or followup on instructors' use of their new skills or other procedures required, and the broadening of this training to other areas required in the CMI environment (e.g., handling student motivational problems and assessing learning weaknesses outside the study skills area).

3. Instructor training in specific CMI roles and the skills required to effectively perform these roles can have a positive impact on instructor attitudes and role perceptions in a CMI environment.

6.4 Recommendations for Use of Materials Produced in this Project

1. The Study Skills Questionnaire should be made part of each course's preassessment battery or placed in the first course block, so that it can be used to help identify students with specific study skills problems or those who will have difficulty successfully completing the course.

2. The four Study Skills Modules should be reproduced in sufficient quantity to be used by students identified as having study skills problems.

3. An Instructor Orientation and Training Workshop in those skills required to effectively use the Study Skills Questionnaire and Modules should become an on-going in-service training program in each course.

6.5 Recommendations for Future Research

This project has demonstrated the positive benefit of student skill training on reducing the costs of military technical training by helping students and instructors become more efficient and effective in their respective roles. However, a number of questions remain unanswered and indicate areas recommended for future research:

1. Research aimed at individualizing the assignment and/or reassignment of study skills training in order to obtain maximum benefit from this type of training.

2. Research to isolate the cut-off scores, on the Study Skills Questionnaire, which are most reliably related to student performance (times, scores) in CMI technical training courses, as well as to the need of the student for particular types of study skills remediation.

3. Research into the types of roles required of instructors in a CMI environment, particularly as these relate to their function as facilitators of the learning process, and specific training packages need to be developed and evaluated in CMI technical training environments.

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7.0 GLOSSARY OF TERMS

ADAPTIVE MODEL - Consists of a set of computer programs that generate Individual Instructional Assignments, predict and assign individual block and course completion time targets (Student Progress Management), allocates training resources and is the vehicle for accomplishing continual test and courseware evaluation and refinement.

ADVANCED INSTRUCTIONAL SYSTEM (AIS) - A prototype, comprehensive computer-managed and computer-assisted instructional system to provide the following automated capabilities in support of large scale training: Individual Instructional Assignments, Student Progress Management, resource allocation and scheduling, information storage and report generation and evaluation and research.

ALTERNATIVE MODULES - Modules utilizing different instructional approaches from previously existing modules to meet the specific needs of particular types of students and/or certain course requirements. (See Instructional Module).

BLOCK - A course component comprised of lessons and modules that cover a specific subject/content area and normally ends with a comprehensive test.

COMPUTER-MANAGED INSTRUCTION (CMI) - Use of the computer to manage students through the instructional process. The computer's role is that of a diagnostician and manager of instructional events. Through the Adaptive Model, it generates Individual Instructional Assignments (IIAs), predicts and assigns individual block and course completion times, allocates training resources and evaluates tests and courseware. The utilization ratio is 100 students per management terminal.

COMPUTER SOFTWARE - A logical grouping of programmed computer codes that gives commands to a computer to perform a particular function. A unique AIS software component is the Computer Assisted/Managed Instructional Language (CAMIL) that facilitates both CAI and CMI.

CONVENTIONAL TRAINING - Classroom and/or laboratory training conducted in a previously established and accepted manner, i.e., usually a classroom lecturer and/or laboratory instructor-student group relationship in a lock-step mode of progress.

COURSE - A block or a series of blocks of instruction designed to satisfy Specialty Training Standards for a particular Air Force Specialty Code and skill level. Formal, resident training conducted at an Air Training Command installation.

COURSE COMPLETION PREDICTIONS - A computer-generated estimate of a student's time required to complete the course based upon Pre-assessment Testing. Predictions may be made for completion of modules, lessons, or blocks as well as for the entire course.

COURSE COMPLETION TARGET - A course completion prediction adjusted for course policy regarding the desired minimum, maximum ana average course completion times.

COURSE COMPLETION TIMES - Measured classroom time from course entry to graduation.

COURSE DATA BASE - A collection of computerized files containing the parameters and flags which control the operation of the Adaptive Model for a specific course.

CRITERION-REFERENCED TESTING - A testing methodology in which test items are written to assess student performance on defined behavioral objectives with respect to a specified standard of mastery (e.g., 70 percent correct).

CRITERION VARIABLES - Measures of student performance, times and score, on lesson and block tests.

FORMATIVE EVALUATION - That type of evaluation research whose purpose is to detect weaknesses in instructional materials or procedures and provide a basis for correcting such weaknesses.

INDIVIDUALIZATION - See Individualized Instructional Assignment.

INDIVIDUALIZED INSTRUCTIONAL ASSIGNMENT - The AIS/CMI capability to assign individual students to alternative modules of instruction for a lesson in order to achieve optimal performance from each student.

INSTRUCTOR WORKSHOPS - A training format used during the formative and summative evaluations. Emphasis of these workshops was on the training of instructors in study skill techniques and diagnostic, counseling and remediation skills, in participative discussion and practice sessions.

INSTRUCTIONAL MATERIALS - Printed, audio, or visual information used in instruction. Includes programmed texts, picture books, workbooks, audio visuals, checklists, technical orders and tests.

INSTRUCTIONAL MODULE - A specific package of instructional materials and related training resources for presentation of a specific AIS lesson. A lesson may have more than one instructional module. All modules for a lesson teach the same objectives but differ in the method of presentation and/or strategies used.

INTERACTIVE (A) TERMINAL - Consists of a plasma display and keyboard and is used by instructors and course authors to interact with the AIS central computer and data files and by students for on-line, adaptive testing and CAI.

LEARNING CENTERS - A learning environment to which students are assigned for attendance-taking purposes and in which most coursework is conducted. Consists of carrels, media and job related equipment and/or simulators designed to support individualized instruction.

LESSON - A component of a block of instruction. Contains instructional information to enable achievement of a learning objective or series of objectives. A lesson is learned through the use of one or more specific instructional modules.

MODULE - The smallest testable unit of instruction within a block of instruction. A set of instructional materials which applies a specific instructional approach for teaching a lesson. (See Instructional Module).

OPERATIONAL TRYOUT - Defined for the project, as a second phase of the formative evaluation accomplished by a large-scale evaluation. During this phase the primary consideration was the effect of the treatment on the subjects subsequent behavior.

PREDICTOR VARIABLES - Measures of student abilities, aptitudes, interests, personality, or past performance which are expected to be related to criterion variables of interest (e.g., student times or scores).

PREASSESSMENT DATA - The results of a test battery given to students before they begin a course. The battery is designed to measure student abilities, attitudes, interests and backgrounds. Pre-assessment data, in conjunction with Within-Course Testing is used for Individualized Instructional Assignment and Student Progress Management.

PRESCRIPTION - A computer generated student status report indicating the student's performance on his/her last assignment, his/her next assignment and related training resources required, if any.

RANDOM ASSIGNMENT - The option to specify the percentage of students who should be assigned randomly to the alternative module for a lesson. Provides experimental control groups for AIS related research and/or for development of regression equations.

SELF-PACING - A generic description of programs where learning and progress occur at each student's self-established pace. Generally, students whose rate of progress exceeds predetermined limits are counseled.

SKILL TRAINING - That instructional training aimed at remediating or compensating for particular student weaknesses in academically related areas (e.g., self-management skills, study skills).

SMALL-GROUP TRYOUTS - Defined in this project as the first phase of the formative evaluation. During this phase, the primary concern was to what extent the treatment was performing as designed.

SOFTWARE - See Computer Software

STATE-OF-THE-ART - Current level, state, or condition of technology in disciplines related to computer-based education and training.

STUDENT DATA PROFILE (SDP) - A computerized file that maintains comprehensive records for each student enrolled in an AIS course. Each student record contains bibliographic, preassessment and within-course performance data.

STUDENT PROGRESS MANAGEMENT COMPONENT (SPMC) - The AIS capability to predict and assign individual block and course completion time targets based on each student's individual aptitudes, abilities, and performance and to provide students and instructors with daily feedback on each student's progress toward the target completion times. Thus, SPMC consists of Student Progress Management software and the Orientation/Time Management Module.

SUMMATIVE EVALUATION - That type of evaluation research whose purpose is to assess the overall operational effectiveness of a program via a large scale tryout. For the purposes of this project, summative evaluation was considered to be a second large-scale tryout in which data on approximately 50 students per treatment were collected.

TARGETED COURSE COMPLETION RATE - A computer generated rate of progress through a course for each student which he/she must maintain to meet the course completion target.

TEST-WISENESS - The ability to combine subject knowledge with clues in the test to get a score which reflects how much a person knows about a specific subject.

APPENDIX A

READING COMPREHENSION MODULE

TABLE OF CONTENTS

READING COMPREHENSION

The objectives for this lesson on Reading Comprehension are:

1. You will be able to use the Questioning method of studying;

2. You will be able to use the Network method of studying;

3. You will be able to use the Problem Solving method of studying;

4. You will be able to determine which of the three reading methods

   is best for you and to use this method when you are studying.

We've all had the experience of reading a lesson, following the author's chain of thought, and all of a sudden coming across a sentence or paragraph which just doesn't make sense. We usually know we don't understand what the author is saying, yet we don't know what to do about it. Other times we begin to read a book and don't even make it past the first sentence. Sometimes the vocabulary is hard. Sometimes the sentence structure is difficult. Many times the lesson has a lot of new ideas or words. What we need is a method to help us. That's what this unit will offer you: methods for dealing with reading problems.

We have found that there are three basic methods which seem to help students with reading problems: (a) Questioning, (b) Networking, and (c) Problem Solving. In this lesson we will discuss each of these methods in detail and give you some practice using each of them.

These three methods of studying help students understand what they read because these methods are based on learning theories and the success experiences of other students. We are not saying that there are only three ways to study, but some of the other study habits people use can really do them more harm than good.

43

Some students copy their notes several times. Some students take "notes" as they read, copying the book word for word. Some students just ignore words or sentences which they don't understand. Can you think of some things that you do when you are studying that may not be helping you?

When you complete this lesson, you may decide that one method works better for you than any of the others or you may find that 2 of them work equally well for you. On the other hand, you may find that all 3 are useful to you. Whatever you decide, be sure to practice your chosen method(s) on all of your course lessons so that you can become your own learning methods expert.

The first study method we will talk about is Questioning...the use of questions to figure out the main idea of a paragraph.

Questioning

The questioning method consists of four steps:

Step 1: Determine the purpose of your study and set up your time schedule. You may be studying to take a test or to learn how to write a computer program. The amount of time you are going to spend will often depend on the reasons for your study and the kind of material you are studying.

Step 2: Read to find the main idea. Read the first paragraph of

your lesson. Decide if the main idea is clear or not. The

main idea is often found in the first sentence of the para-

graph. The main idea is also often found in the last

sentence of the paragraph. The other sentences in the

paragraph often give the reader more information about the

main idea. If the point the author is making is clear to

you, write it down. If it is not, write down the part or

parts of the paragraph that you think to be important points.

Step 3: Make up a question. Your question should test your under-

standing of the main point of the paragraph. Look at the

example below which is a paragraph explaining the concept

"organization:"

> An organization is a group of people who do
> things together because they have the same
> interests or problems. Organizations have
> rules and they often have a leader. The
> United Nations and the school safety patrol
> are examples of organizations.

A good question would be "What is an organization?". The

answer to that question would state the main idea of the

paragraph.

If possible, you should make up a question which asks for

an example of the main idea of the paragraph. The example

should be different from any which were given in the para-

graph. In the above example, a good question would be:

Give an example of an organization which is different from

any given in the passage.

45

In short, your questions should fulfill three objects: The question should (a) be based on the main idea; (b) call for use of the main ideas in making up new examples; and (c) should be written in your own words.

Repeat Steps 2 and 3 on each paragraph. That is, read, write down the main point(s) and make up a question over the paragraph material.

Step 4: <u>Learn the answer to your questions.</u> After you finish reading, try to remember the answer to your questions. If you can't remember them, look them up in the text, but don't waste time writing them down.

The next part of this lesson will give you the chance to practice the Questioning method on several paragraphs. As you go through the material, you may want to go back to earlier questions to rewrite them. You should do that whenever you wish to. After reading each paragraph, write your question below that paragraph. The next page will give an example of what we picked as the main idea of that paragraph and a question we feel comes from that main point.

<u>Remember</u>: There are many different ways of asking a good question. <u>Your</u> questions, however, will probably be the best aid for you to understand and remember what you read. If you are not sure about how good your question is, use the following checklist:

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1. Does the question come from the main point of the paragraph?
   If not, write a question that does.

2. Does the question ask for a new example of the main idea?
   If not, can a new question be created that does?

3. Does the question repeat words or groups of words from the
   text? If so, could these be replaced with your own words
   which mean the same thing?

Below is an example of the use of the Questioning technique. Read
the paragraph and then read the question we have written and the
comments we have added. If you understand this example, go on to the
next page and practice the Questioning method. If you don't understand
this example, return to page 2 and review the 4 steps of the Questioning
method or ask your instructor for help.

Nitrogen is sometimes called a "lazy" gas. It is, however, im-
portant. We are not built to live in pure oxygen. The nitrogen weakens
the oxygen so that the air is right for us. The nitrogen serves the
same purpose in the air that water serves in lemonade. Lemonade made
of pure lemon juice and sugar would be too strong to be pleasant. To
keep the lemonade from being too strong, we add water.

Question: Why is nitrogen important? Give an example of how nitrogen
works that is different from that used in the text.

COMMENTS: The main idea of the above paragraph is that nitrogen weakens
the oxygen so that the air is right for us. The question was written in
such a way that its answer will be the main idea of the paragraph.

Note that the words of the question are not the same as those in the
text.

An example of how nitrogen works that is different from that used
in the text would be adding water to orange juice to keep it from being
too strong.

Below is an example of the use of the Questioning technique. Read the paragraph, and then read the question we have written and the comments we have added. If you understand this example, go on to the next page and practice the Questioning method. If you don't understand this example, return to Page 2 and review the 4 steps of the Questioning method or ask your instructor for help.

You may have noticed that when you see a rainbow you always have your back to the sun. In the morning, when the sun is in the eastern sky, rainbows always appear in the west. In the afternoon they are always in the eastern sky. Rainbows are always in the opposite direction from the sun.

Question: What is the relationship between rainbows and the sun?

COMMENTS: The main idea of the above paragraph is that rainbows always appear in the sky in the opposite direction from the sun. The question was written in such a way that its answer will be the main idea of the paragraph.

Note that the words of the question are not the same as those in the text.

Asking for a new example is not necessary in this paragraph because there is only one position from which you can see a rainbow--when the sun is at your back.

Use the Questioning Method in reading the paragraph below. Figure out the main idea, underline it, and write a question at the bottom of the page. Try to answer the question in your own mind and then compare your question with the one we have written on the next page.

People used to be frightened whenever there was an eclipse of the sun or the moon. Now they are not frightened, because scientists have found out what causes eclipses. The moon travels around the earth. An eclipse of the sun is caused when the moon passes between us and the sun. An eclipse of the moon is caused when the moon travels into the earth's shadow.

People used to be frightened whenever there was an eclipse of either the sun or the moon. Now they are not frightened, because scientists have found out what causes eclipses. The moon travels around the earth. <u>An eclipse of the sun is caused when the moon passes between us and the sun.</u> <u>An eclipse of the moon is caused when the moon travels into the earth's shadow.</u>

<u>Question</u>: How do eclipses both of the sun and the moon occur?

COMMENT: The answer to this question is: "As the moon travels around the earth, it causes an eclipse of the sun by passing in front of it or an eclipse of the moon by passing into the earth's shadow." This is the main idea of the paragraph.

The next 2 pages contain a short passage so that you can practice the Questioning method on more than one paragraph. After you read each paragraph, underline the main idea and write down your question.

Remember to write questions that fulfill the 3 objectives outlined in the third step of the Questioning Method. That is, your questions should be based on important ideas, they should call for a new example of the idea, if possible; and they should not repeat words from the passage.

You can also check your questions with those we have written (Page 54).

QUESTIONING AS A STUDY AID

The results of using questions as a   1. **Question:**
study aid show that students who use
questions in studying do better on tests
than students who don't use questions.
Research reveals that when students are
asked or ask questions, even after a long
passage, such as at the end of a chapter
in a textbook, they can be very helpful to
learning.

It seems that study questions act   2. **Question:**
primarily on the student's ability to
get the information out of his or her
head. Asking questions while studying
helps students "retrieve" the information
they need when they are taking a test.

The Questioning method of studying   3. **Question:**
was also found to be useful in a computer-
assisted instructional system. When the
students signed on at a terminal, they
were given a reading assignment which took
them 15-20 minutes to study. They were
also given several study questions. After
reading the assignment, they reported back
to the terminal and were given a test over
the material they had just read. If they did
not answer at least 75% of the questions
correctly, they were told to read the
material again. After rereading the
material, they signed onto the terminal
again and retook the test. The per-
formance of students who had their study
managed by the computer system was compared

with a group of students who read the
material on their own. In each of three
semesters, those students who used the
study questions from the computer to help
them learn the material did much better
on a final test than did a group of students
who read the material on their own.

Our Questions on Questioning As A Study Aid

1. Question: How do students who use questioning as a study aid do
   on tests compared to students who don't use this method?

2. Question: What do study questions help students to do?

3. Question: Which group of students did better on the final test?

This is the end of the Reading Comprehension section on Questioning.
This technique may be your favorite. On the other hand, read the next
two sections on Networking and Problem Solving to make sure that you
know all of the choices you have to solve your reading problem.

Networking

Networking is a method of organizing information. It is based on research which shows that very good students think about how ideas and concepts relate to each other. By thinking about these relationships, very good students learn new material quickly and easily. Thus, Networking is a method of organizing relationships. It is like making a map of the material you wish to learn. Just as having a road map aids the traveler in getting from one place to another, Networks can help you get from one idea to another when you try to understand information.

You might think of Networking as creating highways between major ideas. If I am in Austin, Texas, and I want to get to Fort Worth, I know that the highway (relationship or link) connecting them is Interstate 35. Further, I know that there are other roads connecting those 2 cities. There's a state highway, a farm-to-market road, and so forth.

My task appears much easier, doesn't it? I simply choose the road I want to take, locate that road, and presto, I'm in Fort Worth. So the first important part of Networking is making links or relationships between ideas.

Another important part of Networking is its use of mental pictures. There has been some recent research which shows that having people try to "picture" what they are reading about or listening to helps them remember it much better than when they don't. The funny thing is that it will work even if you can't really see a mental picture. The only thing that seems important is the act of trying to "picture" it. It doesn't matter whether you are successful or not.

Pictures are also good because you can make them very interesting, exciting, pleasant, funny, and so on. So, if you put pictures in your memory or in your "notes," when you come back to review what you have been reading, it will be much more fun. In a way, making interesting pictures is like adding spices to foods to make them taste better.

So thinking and drawing interesting pictures of what you read is something we would like you to start doing. Please don't be afraid if you don't draw very well. The pictures you draw are just notes to yourself.

The third part of Networking is "paraphrasing" (para-fraze-ing). By this we simply mean to put what the author is saying in your own words. For instance, if the author said, "The economy of the United States is in grave trouble", we might simply say "The U.S. economy is a mess."

Also, you might want to spice up your paraphrases. Just as silly or funny pictures are more easily remembered, so too are silly or funny paraphrases. For example, for the author's statement in the last paragraph, we might spice up our paraphrase by saying "Uncle Sam writes rubber checks!"

OK, now you know that Networking is a method of organizing information through your creation of relationships or links and mental pictures. Figure 1 gives a picture of why and how Networking is used. That is, the teacher or author in Figure 1 has stored Networks or maps in his head and he is trying to tell students about these Networks. In order to do that, the maps in the instructor's or author's head have to be put into words.

56

TEACHER/AUTHOR   STUDENT

REALITY   REALITY

FIGURE 1

57
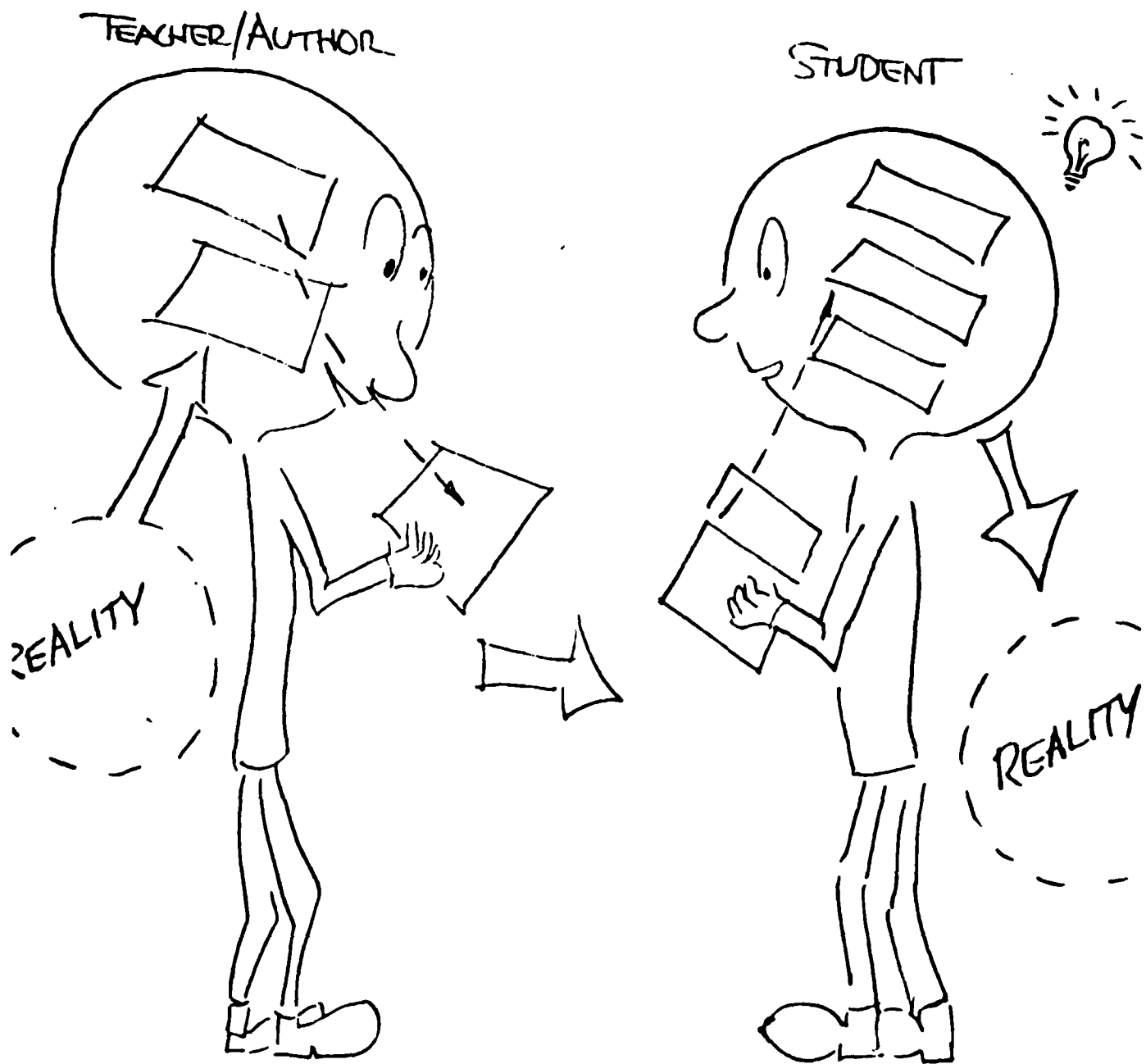
Putting mental maps into words takes an idea from two dimensions down to one--very much like going from an airplane, where you can see how cities or farms are laid out, to a car, where you usually can only see a few hundred feet in any one direction. A textbook or a lecture forces you to look at information in a way that is similar to taking a trip in a car. This is usually not enough for real understanding so it is probably very helpful in most cases to see the big picture by creating a map.

So, after the author's map is converted into words, it is the students' job to decode the text--to find out what the author is trying to say. As the students form their own maps, they organize the information and add their own feelings and pictures to the material in order to remember it.

Before you practice making mental pictures and links between ideas, let's talk about the kinds of links or relationships that can connect ideas. You probably already know all of the links we are going to talk about but you may not know the names of these links. To help you learn these names, let's look at the idea "AIR FORCE."

What are some things that are known about the AIR FORCE? First, the AIR FORCE is one of the three military departments that make up the Department of Defense (DOD). In Networking, we show this AF-DOD link (relationship) by a solid line and a "t" for type of. (See Figure 2.) The other two military departments are the Navy and the Army, which also have type of links with the DOD. (See Figure 2.)

One way of describing the AF is as an organization responsible for
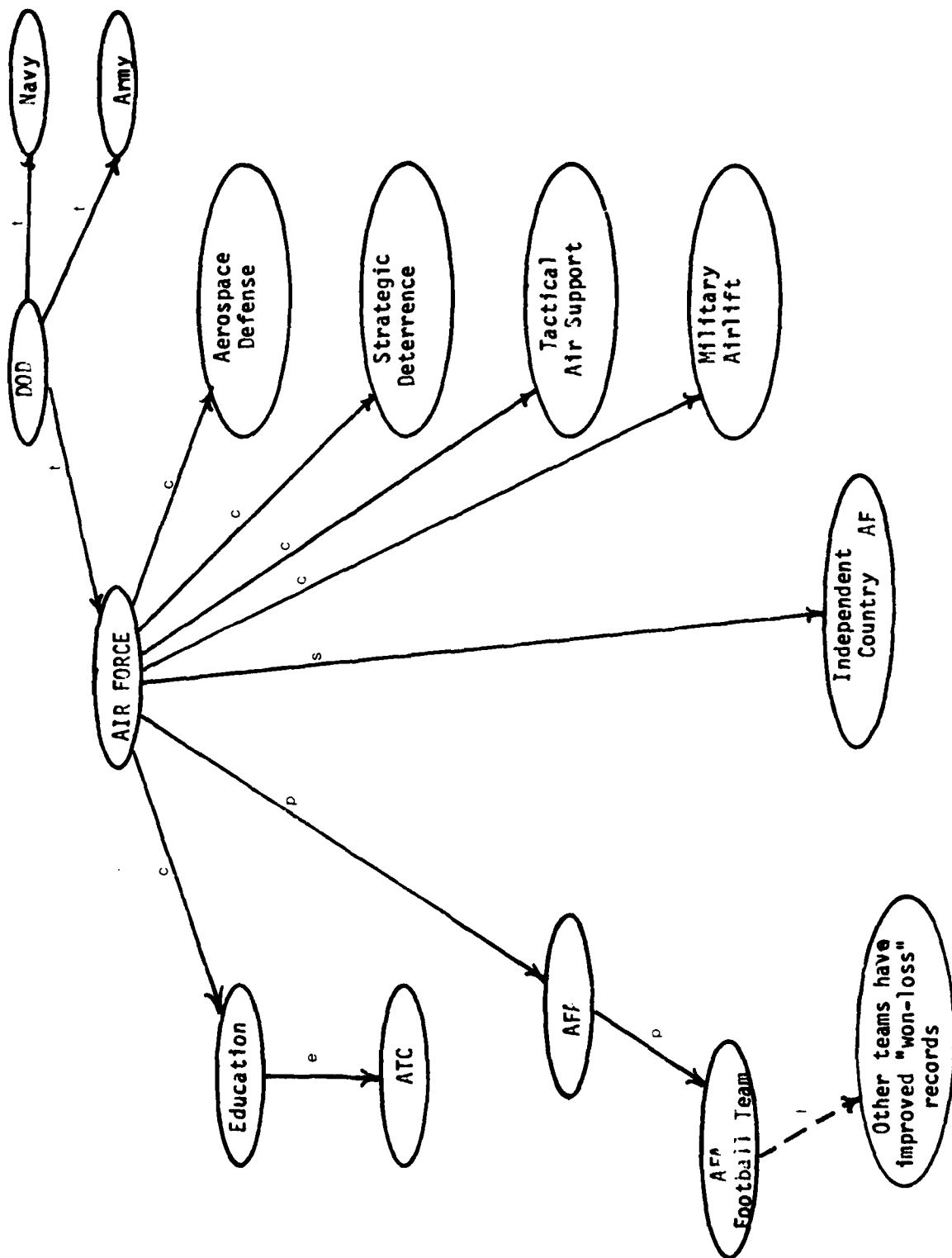
FIGURE 2

maintaining the forces necessary for (a) aerospace defense, (b) strategic deterrence, (c) tactical air support, and (d) military airlift. These activities characterize the AF. Thus, in Networking, we use a solid line labeled "c" to indicate this characterize relationship (link). (See Figure 2.)

The number of AIR FORCE activities is so large that in many ways the AIR FORCE is similar to a small country. Both the AIR FORCE and a small country have organizations that deal with personnel, health, housing, education, budgeting and accounting, research and development, procurement, weather, security, communications, transportation, and even recreation. Thus, the AIR FORCE can be considered similar to a small country and we can use an "s" link to show this similar relationship (link). (See Figure 2.)

One part of the AIR FORCE is the AIR FORCE Academy. The AFA is part of (p) the AIR FORCE educational program so it is linked with the AIR FORCE by a "p" link. (See Figure 2.) Recently, playing the AFA football team has resulted in improved "won-loss" records for other teams. We could, therefore, connect the AFA to this favorable trend for the other schools by a leads to link (a dotted line with an "1" in Figure 2).

Another feature of the AIR FORCE is it's many educational programs. The AF offers some type of educational program to all its people. Thus, we can say that education is another feature which characterizes the AF. We show this relationship by connecting AF and education with a solid line and the letter "c". (See Figure 2.) There is much evidence that this is true. The AIR FORCE Air Training Command (ATC) is the largest

60

technical training institution in the world today. Thousands of
students graduate each year from professional courses conducted by the
Air University and upgrading, qualification, and certification training
continue throughout the careers of AIR FORCE personnel. Thus, the
size and complexity of ATC shows that the AIR FORCE believes that
education is important. We can, therefore, add an evidence link ("e")
to represent the relationship between ATC on the AIR FORCE education
program (see Figure 2).

This discussion of the concept "AIR FORCE" has pointed out the six
basic relationships or links that are present in any body of information.
These links are:

1. part of (p)

2. type of (t)

3. leads to (1)

4. similar to (s)

5. characteristic (c)

6. evidence (e)

They form the building blocks of the Networking method. Your next
question might very well be, "How are these building blocks used?"
Perhaps an example will show this best. Look at the two study techniques
below. On the left side of the page is an outline for a lesson on study
habits. On the right side of the page is a Network for the same lesson.

Study Habits

A. Introduction

B. Steps for Studying

    1. Set the mood

        a. relaxation
        b. self-talk
        c. mental pictures

    2. Understand

        a. get the Big Picture
        b. mark important, interesting
           or problem parts

    3. Make personal picture of new
       information

        a. take notes, adding and
           organizing important
           and interesting material
        b. solve remaining problems by
           looking at small parts of
           material

C. Summary

Hand-drawn network diagram: Study Habits — P→ INTRO, P→ Summary, P→ Steps for Studying; Steps for Studying — P→ Set the mood, P→ Understand, P→ Personal Picture; Set the mood — P→ relaxation, P→ mental pictures, P→ Self talk; Understand — P→ Big Picture, P→ mark; Personal Picture — P→ TAKE NOTES, → So.
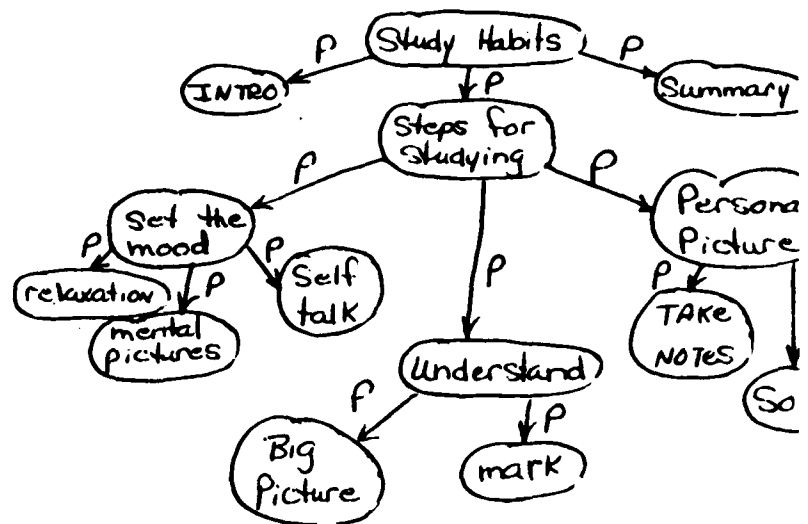
Thus, the building blocks of Networking are used to show the relationships (links) between ideas so that the student (you) can really understand what the author or instructor is trying to teach you. Now the question is "What are the specific steps that a student should take to Network his or her lessons?"

In using Networking, you should take the following steps:

1. <u>Read and mark</u> the section of material you are learning. You should mark or write down the important words and ideas and note the links (relationships) that exist between the ideas.

2. <u>Network</u> the information in order to organize the important ideas. In making your Networks, you should add personal comments, questions and pictures to make your Network your own. This will help you remember the material.

3. <u>Read</u> through your Network and <u>memorize</u> the <u>important information</u>. It will help you remember the information later if you try to picture the shape of the Network in your mind. (This third step will often be done when you are reviewing (cramming) for a test.)

AN EXAMPLE OF HOW THE NETWORKING METHOD IS USED:

The following is a short passage on the concept "learning." We have written a Network for it. Please look at the passage with the notes in the margin and at the Network. It will provide a good example of how to organize material. If you have any questions, please ask your instructor for help.

<u>Learning</u>

Today many people in our society are calling for some kind of educational change. One of the biggest problems in our current school system seems to be that very few people know how to teach students how to learn. That is, it is often thought that students will learn simply because they are asked or told to learn.

Important point that seems to be that students are not taught how to learn even though they are told to do it for at least 12 years of their life.

Even in first and second grade classes, you can often find teachers telling their students to learn or read a lesson but giving them no hints on how to do this. The belief that the ability to learn is present at birth in every child is not true. It may be true that many children and adults do become good learners and students because of their experience, but the schools rarely do much to organize or help students share these experiences.

Some recent research shows that in learning to be a good student, people use active methods to put new information into their memory system. They do not act as simple containers into which information is poured. That is, research shows that people learn new information when they change it to fit their personal memory system.

Learning is a skill which has to be-learned AND our schools often don't teach it.

People learn by putting new material into their own words

NOT
This →

This ↓

NEW INFO

NEW INFO

MY MEMORY SYSTEM

LEARNING

C → SKILL which has to be learned

C → schools often don't teach it

↓ C

People learn by putting new information into their own WORDS

↓ P

Teachers ASSUME students Know how to learn

64
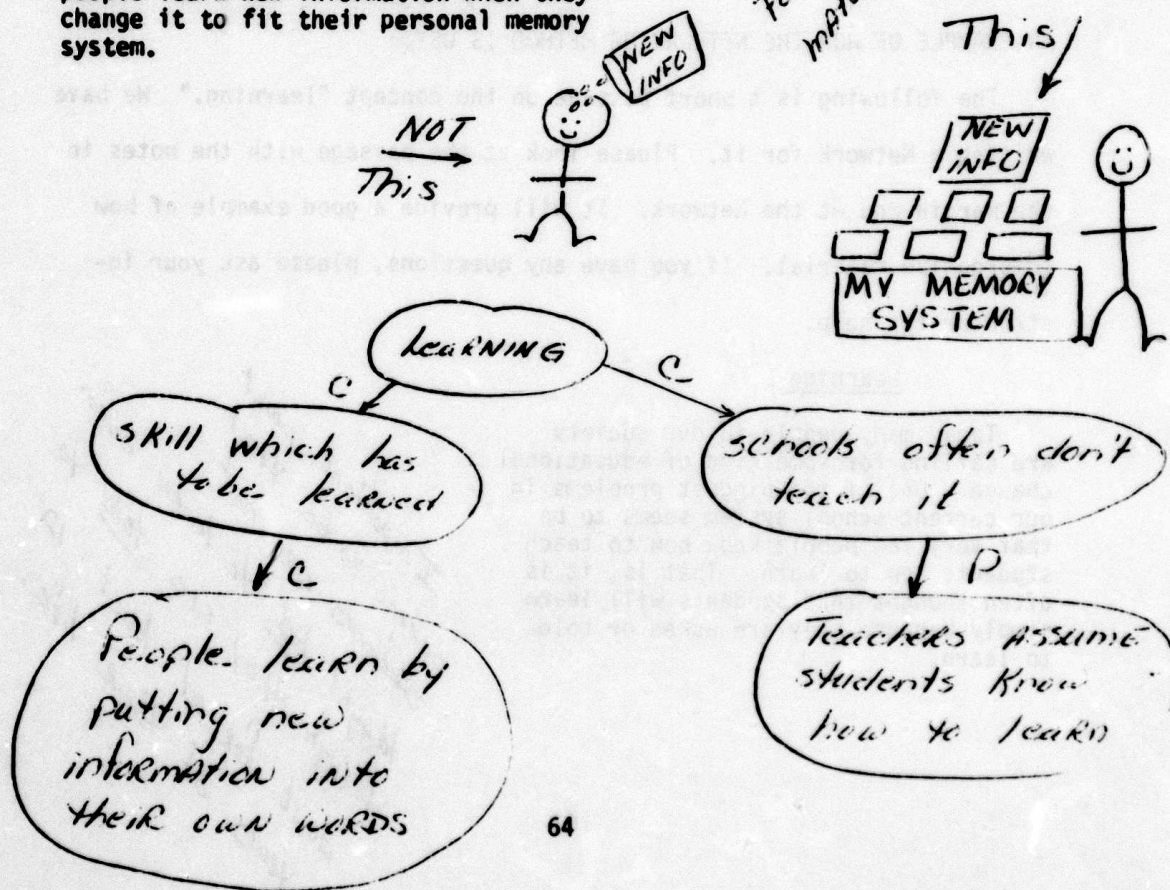
And that is all there is to Networking. There are, however, some important points about this study method which you should keep in mind. Also, the next page is a Network of the Networking Method. See if you can understand it.

Some Important Points About Networking

1. Make as many links between important ideas as possible.

   The more links, the easier it is to "retrieve" the material. This is like traveling to a city with a lot of roads going into it. It's a lot easier to get into such a city than into one with a few access roads.

2. Networking can be used to organize material for papers and speeches.

   Create a map and then use it as an outline.

3. Learning to think in terms of relationships will help you study even if you don't use the whole Networking method.

   It takes somewhat longer than one reading would take but after the method is learned it probably takes even less time than studying by simply underlining or by taking notes and it is certainly more effective.

5. Networking is not magic!

   It will help you, but you have to be willing to put in the time and energy to learn it. It is a new skill and at first it will not feel very comfortable. (Remember how you felt when you first learned to drive a car!) After awhile, however, it will smooth out and you will become a master of the method.

6. Finally, one way to help things keep moving is to celebrate small happenings; small victories over the material you are studying, small insights, etc. Enjoy it when you remember something you didn't think you knew. Get excited about finding a relationship between two ideas that you had never thought of before! Feeling good about these small things helps to make learning enjoyable and exciting!

NETWORKING

definition

Conversion of Text or Knowledge Into A Two Dimensional Node-Link Diagram

The more readable the text the easier it should be to network

Networking could serve as the basis of a readability measure

Ability to make good network goes with good comprehension

Networking could serve as the basis of determining how well a student understands a lesson

Provides another way of writing standard text

Presenting networks as supplements to text material will increase comprehension and retention

Additional, extra-text material can be added to network

Improved ability to link new info that has already been learned

Employs a relationship system that can be used as an internal language

Can be used to improve ability to get at info that has been learned

Can be used to improve under-standing

Points out areas of specific difficulty

Can be Used as a diagnostic tool

Makes Student increase depth of understanding

Improved retention

Increased mental effort

Improved Concentra-tion

66

The next section on Problem Solving will complete your list of possible solutions to reading problems.

PROBLEM SOLVING

Problem Solving involves 3 steps:

1. Figure out the problem

2. Gather information to solve the problem

3. Check and change the solution

Problem Solving also involves using worksheets to help you go through each of these steps. We will tell you more about those worksheets in a minute. First, let's talk about the three steps of Problem Solving.

The Problem Solving method is not going to make you understand everything you read. However, if you identify something you don't understand and work on it, you will know a lot more about the topic than if you had just read over the material two or three times and not understood the material any better on the third reading than on the first. Why should we plan to learn anything by recycling or rerunning the same material through our head in the very same way? We learn by moving the material away from the author's words and into our own words and experience.

You can improve your understanding by following the simple steps we will outline for you. You may not understand the material completely but having applied the method could mean the difference between being able to answer a test question or not.

So, let's begin.

Step 1: FIGURE OUT THE PROBLEM. It looks to us that in understanding new information, there are four common problems: (a) word problems; (b) sentence problems; (c) paragraph problems; and (d) passage problems. But what, exactly, do each of these problem areas mean?

Common Problems in Understanding

1. **Word** -   not understanding what a word means. It may be a technical word, unfamiliar word, or a common word used in an uncommon way.

2. **Sentence** -   not understanding the meaning of an individual sentence. It may be due to the order of the words (sentence structure) rather than the meaning of the words themselves (vocabulary). It may be hard to figure out the subject or the topic of a sentence. <u>Note</u>: If you understand an individual sentence (its words, structure and topic) but don't understand how it fits with the paragraph, consider this a <u>paragraph</u> problem.

3. **Paragraph** -   not understanding what a paragraph means. This may be due to (a) not being able to understand how the sentences fit in with the topic of the paragraph; (b) not being able to figure out the topic of the paragraph; (c) not being able to fit the topic of the paragraph in with the <u>passage as a whole</u>.

Note: Do not work at the paragraph level until
you have understood each sentence in the paragraph.
You should have worked at the word or sentence level,
before moving to the paragraph level if you had any
problems with individual words or sentences. In
short, come to the paragraph level only after having
understood each individual sentence in the paragraph.

4. Passage -   not understanding the main idea(s) of a passage. It
may be due to not knowing the topic of the passage or
to not understanding how each paragraph fits in with
the topic of the passage.

Note: Come to this level only after you understand
each individual paragraph.

Okay, now if you are having a problem with a lesson, you can use the
list of problem areas above to help you decide what kind of a problem you
have. For example, don't begin at the paragraph level unless you under-
stand each of the individual sentences within the paragraph. Don't choose
a sentence unless you understand each of the words of the sentence.

Step 2: GATHER INFORMATION: Now that you have figured out the problem,

you are ready to gather information to help you solve it. We

have identified three ways to get information on your problem:

1. Breakdown -   Looking at the parts to understand the whole.
                    One way you may decide to work on your problem
                    is to take apart the word, sentence, paragraph,
                    or passage to figure out its meaning.

2. Surround -   Looking at the whole to understand the part.
                    Another way you may work on your problem is to
                    look at what is close to the problem area
                    (surrounding words, sentences, paragraphs, or
                    passages).

                    Begin as close to the problem as possible (the
                    closest thing you understand) and work into
                    the problem. If this information doesn't help,
                    go to the next closest part you understand.
                    Continue this process.

3. Other Source - Looking at another source to understand the
                    part or whole. This may be the dictionary,
                    another textbook, the instructor, or a fellow
                    student.

In order to help you gather information on your problem, we have made

up several worksheets--one for each type of problem (word, sentence,

paragraph, or passage). After you have identified the type of problem

you have, use the worksheet which goes with your problem to gather

information. These worksheets are at the end of this lesson.

You will note that other information on how to solve your problem is

attached to the end of each worksheet. You should read these extra hints

to make sure you're using all the information.

In other words, after you decide where the problem is (word, sentence, paragraph, passage) you will use the worksheet that goes with that problem to gather information. With that information to help you, you will then make your best guess as to the meaning of the problem area.

Step 3: CHECK AND CORRECT. After you have made your best guess as to the meaning of the problem, you need to test how good your guess really was. One way to judge your guess is to see if it fits with the rest of the material. If everything fits and you have kind of an "Oh, yeah, this makes sense" feeling, your guess is probably right. If you can find something that still doesn't fit in with the meaning you suggested, you had better try again. If you are really unsure of your guess, write that down on the worksheet under Step 3: Check and Correct. You can then make plans to get more information as you read more of the lesson.

You also need to judge your Problem Solving skills after making a best guess. That is, write down any corrections you want to make in your Problem Solving method. For example, maybe you spent too much time figuring out the problem when you really needed to begin at the "word" sheet anyway.

Next, judge your reading method based on what you have learned about your problems. For example, if you changed your reading speed to fit the material you are trying to learn, would you keep this problem from coming up again? Do you need to keep track of the main idea? Write some suggestions to yourself but don't be upset if you are not sure of corrections. Your instructor is always ready to help you.

Thus, the three steps in Problem Solving are:

1. Figure out the problem.

2. Gather information (using worksheet if necessary).

3. Check and correct.

These steps will become easier to understand if you read each of the worksheets and the information that goes with each one. The worksheets are at the end of this lesson. After you use this method several times you may find that the worksheets are not necessary for you. At any rate, be sure to try this method several times before deciding whether or not it is "for you."

SUMMARY OF PROBLEM SOLVING METHOD

You may not feel that the worksheets suit your needs. Don't feel that you have to use them all the time. They are simply examples of ways to work on problems.

The following chart summarizes the Problem Solving method and may be your main source of help after you have used the method several times.

Thus, the three methods which we recommend to students having reading problems are:

1. Questionning

2. Networking

3. Problem Solving

As we indicated earlier, one, two, or all of these methods may work for you. On the other hand, combining two or three of them might be best for you. You need to decide (make a definite choice) what kind of learning method works best for you. One way to make this decision is to try each of the methods on a trial basis for three or four days and then decide which one feels most comfortable to you.

Remember that your instructor is always available to help you with any of these methods and will be glad to help you work out any problems you have concerning their use.

SUMMARY OF TECHNIQUE

<div align="center">PROBLEM</div>

		Word	Sentence	Paragraph	Passage
(Always begin here)	**Breakdown**	Prefix - Root - Suffix	Subject-verb; topic and comments	Sentences related to paragraph; Topic of paragraph	Paragraphs related to passage; Topic of passage
Source of Information	**Surround**	Synonym; Examples; Other Words	Other sentences in paragraph Main idea of paragraph or paragraphs	Relationship between the paragraph and other paragraphs Topic of passage Table of contents, summary	Other parts of text
	Other Source	Glossary Dictionary	Other texts Other people	Other texts Other people	Other texts Other people
	Best Guess				

WORD PROBLEM

WORD PROBLEM

Step 1: Figure out the problem _____
<p style="text-align:center">Write problem word here.</p>

Step 2: Gather information.

    a. Breakdown. Break the word apart. See lists of prefixes (beginning of word) and suffixes (end of word) on next page.

         _____   _____   _____
          prefix   root   suffix

    b. Surround. Use information in other parts of the sentence or paragraph to define the word. (See Page iv.)

         _____   _____   _____

synonym (another word that means the same thing)	example of word	other words that are like the problem word.

    c. Other Source. Look up the word or ask instructor.

    Glossary (in the back of the textbook) _____

    Dictionary _____

    Instructor _____

    d. Best Guess. Guess the meaning of the word by writing the sentence in your own words.

Step 3: Check and Correct. Judge your Problem Solving Skills and write down the changes you want to make in:

Your best guess:

Your problem solving method:

Your reading method:

COMMON PREFIXES AND SUFFIXES

Common Prefixes (beginning of word)			Common Suffixes (end of word)		
PREFIX	DEFINITION	EXAMPLE	SUFFIX	DEFINITION	EXAMPLE
ad -	(to)	adjust (become used to)	- al	(relation to)	educational relation to education
at -	(from)	attract (to draw from)	- ance	(state of being)	compliance (state of complying)
be -	(by)	beware (by care)	- ate	(one who)	candidate (one who may be chosen for office, membership or honor)
com -	(with)	comfort (with strength)			
de -	(from)	depart (leave from)	- ate	(to make)	violate (act of breaking a law)
dis -	(apart)	disjointed (joints are apart)	- cion	(action)	coercion (the act of forcing)
en -	(in)	enrage (to put in a rage)	- est	(comparison)	largest (comparison of size)
ex -	(out)	exit (go out)	- ian	(relating to)	amphibian (relating to fish)
in -	(into)	inject (to send into)	- ic	(like)	artistic (like an artist)
in -	(not)	invalidate (to make not valid)	- lous	(abounding in)	ridiculous (abounding in humor)
pre -	(before)	prejudice (before judgement)			
pro -	(in front of)	promotion (move in front of)	- ize	(to make)	criticize (to make a critic)
re -	(back)	return (bring back)	- ism	(act of)	cannibalism (act of being cannibal)
sub -	(under)	submarine (under the water)	- less	(without)	meaningless (without meaning)
			- ness	(state of being)	happiness (state of being happy)
			- ster	(one who)	gangster (one who is in a gang)
			- ure	(act of process	architecture (process of being an architect)

WORD PROBLEM (Continued)

SURROUND

Look through other parts of the passage for clues as to the meaning of the problem word. Look for:

1. a synonym - the author may define the word by using another word which has a similar meaning.

2. an example - the author may give you an example of the word. You may be able to define the word based on this.

3. other words - the author may give you clues to the meaning by words throughout the passage.

SENTENCE PROBLEM

SENTENCE PROBLEM

Step 1: Figure out the problem: _____

_____

    Write problem sentence here.

Step 2: Gather information.

    a. Breakdown. Break the sentence into parts: (a) subject-verb
       or (b) topics and comments. See next page for help.

       _____   _____   _____

       subject   verb   other

       _____   _____

       topic   comments on topic

    b. Surround. Use other sentences in the paragraph to figure out
       the problem sentence. Use the topics of the paragraph or
       other sentences to figure out the sentence. See page 82
       for help.

    c. Other Source. Use information from other books, lessons or
       people.

    d. Best Guess. Write sentence in your own words.

Step 3: Check and Correct: Judge your Problem Solving skills and write
       down the changes you want to make in:

    Your best guess:

    Your problem solving method:

    Your reading method:

BREAKDOWN

1. Subject-Verb - Many people have trouble figuring out the subject of a sentence. The order of the words is often the best clue. The subject is often at the beginning of the sentence. It is often followed by the verb which tells you something about the subject. Look at the example below:

      The plane landed in the field.

      clue   verb
   means <u>noun</u>   ending
      <u>follows</u>

2. Topic Words - What is the sentence about? For example, is the author telling you about electricity or stock numbers? And what is the author trying to tell you about this topic?

   Example: Besides an airlift of F-4 jet fighters, there will be a <u>seaborne convoy</u>.

                              Topic

SURROUND

A pronoun (this, he, she, it, they) is often used to refer to a word used in an earlier sentence. Keep track of what each pronoun is referring to! Also, the author may continue the same topic or a related topic from sentence to sentence.

Example: Research in education has not addressed the problem of how students learn. This is due in part to the fact that it has always been assumed that learning was a "natural" ability. Recent evidence indicates that this is not true.

PARAGRAPH PROBLEM

PARAGRAPH PROBLEM

Step 1: Figure out the problem. (Write out the paragraph if you need to.)

Step 2: Gather information.

    a. Breakdown. What is the author telling you? Organize these ideas in an outline or Network. (See attached page). Learn the meaning of the paragraph from breaking the paragraph into sentences.

    b. Surround. Use information from other paragraphs. Figure out how this paragraph relates to the rest of the passage. You need to figure out the main idea of the passage and the links between paragraphs. See next page.

    c. Other Source. Use information from other texts or talk to other students or instructors.

    d. Best Guess. Write the paragraph in your own words or outline it.

Step 3: Check and Correct. Judge your Problem Solving skills and write down the changes you want to make in:

Your best guess:

Your problem solving method:

Your reading method:

If you have already figured out the topic or main idea of the paragraph, but don't know how the sentences relate to the main idea, use the guidelines on the next page to help you.

If you have not figured out the topic or main idea of the paragraph, the guidelines on Page 86 may give you some clues.

HOW ARE SENTENCES RELATED TO THE TOPIC
(MAIN IDEA) OF THE PARAGRAPH

1. The sentence may <u>restate</u> the main idea of the paragraph in different words.

2. The sentence may <u>contrast</u> the main idea of the paragraph with another idea.

3. The sentence may <u>give examples</u> or <u>illustrations</u> that support the main idea of the paragraph.

4. The sentence may <u>provide evidence</u> for the main idea of the paragraph.

5. The sentence may be a <u>result or outcome</u> of the main idea.

6. The sentence may simply <u>describe</u> the main idea of the paragraph.

7. The sentence may contain a <u>subtopic</u> (a part of) the main idea.

8. The sentence may contain details <u>that are not important</u> and which do not belong in the paragraph. Such a sentence should be <u>disregarded</u>.

If you are unable to determine the topic or main idea of a paragraph, use the guidelines below:

FINDING THE MAIN IDEA OF A PARAGRAPH

1. Read the first sentence of the paragraph. It contains the main idea about 80% of the time.

2. If this is the topic sentence, decide what the paragraph is going to be about.

3. See if the rest of the paragraph tells you something about this topic.

4. If the paragraph does tell you something about this topic then it is the topic sentence. Put the idea into your own words.

5. If the first sentence doesn't have the main idea, see if you can find the topic sentence. The next most likely place for it to be is at the end of the paragraph.

6. See if any phrase or sentence expresses a main idea.

7. If the topic sentence can't be found, find some key words or phrases that you can put together to see what they say. Then write an topic sentence for yourself.

If you have determined the topic of a passage but are unable to relate the paragraphs to it, use the guidelines below.

"Relationship Sheet"
HOW ARE PARAGRAPHS RELATED TO A TOPIC?

1. The paragraph may restate the main idea of the passage in different words. The main idea of the passage as a whole and the main idea of the paragraph may be IDENTICAL. Sometimes, two paragraphs say the same thing in different words and thus would share the same main idea.

2. Different paragraphs may contrast the main idea of the passage with other ideas. The paragraphs might compare two ideas, presenting features of each. In short, look for comparisons and contrasts of ideas.

3. Different paragraphs may present examples of the main idea of the passage. A paragraph may talk about an idea which is part of or a type of the idea which is discussed in the passage.

4. Some paragraphs present a principle. Other paragraphs give reasons for this principle. These other paragraphs may present evidence which supports the principle.

5. Paragraphs presenting a principle may also be followed by paragraphs telling about results of the actions or ideas stated in the principle.

6. Paragraphs may describe or qualify the main idea.

7. Paragraphs may develop subtopics of the main topic of the passage. Each paragraph would thus be related to the main idea by being a part of it.

These seven relationships between paragraphs and the topic of the passage are just several of many you can figure out. They are the major relationships and should help you find out how the author organized the material.

If you are unable to determine the topic or main idea of a passage, use the guidelines below.

HOW TO FIND THE TOPIC OF A PASSAGE

1. Figure out the topic of each paragraph.

2. Decide how these topics are related (what information does each paragraph contribute). (See the relationship sheet on the previous page.)

3. Write a general statement that includes the topics of each paragraph. This is your statement of the topic.

PASSAGE PROBLEM

PASSAGE PROBLEM

Step 1: Figure out the problem.

Step 2: Gather information.

   a. Breakdown. Break the passage into paragraphs. Figure out the topic of each paragraph. See next page. Figure out topic of passage. Figure out the links between paragraphs and topic of passage. See page 92. Use outlining or Networking to organize your ideas.

   b. Surround. Look in other parts of the lesson--or the block-- previous lesson, following lesson, overview, table of contents, summary, objectives.

   c. Other Source. Read other texts or talk to other students or instructors

   d. Best Guess. Write an outline or Network of the passage.

Step 3: Check and Correct. Judge your Problem Solving skills and write down the changes you want to make in:

   Your best guess:

   Your problem solving method:

   Your reading method:

PASSAGE PROBLEM

If you are having trouble determining the topic of individual paragraphs, use the guidelines below.

HOW TO DETERMINE THE TOPIC OF A PARAGRAPH

1. Read the first sentence of the paragraph. It contains the main idea about 80% of the time.

2. If this is the topic sentence, decide what the paragraph is going to be about.

3. See if the rest of the paragraph tells you something about this topic.

4. If the paragraph does tell you something about this topic then it is the topic sentence. Put the idea into your own words.

5. If the first sentence doesn't have the main idea, see if you can find the topic sentence. The next most likely place for it to be is at the end of the paragraph.

6. See if any phrase or sentence expresses a main idea.

7. If the topic sentence can't be found, find some key words or phrases that you can put together to see what they say. Then write an topic sentence for yourself.

If you are unable to determine the topic or main idea of the passage, use the guidelines below:

HOW TO FIND THE TOPIC OF A PASSAGE

1. Figure out the topic of each paragraph.

2. Decide how these topics are related (what information does each paragraph contribute). (See relationship sheet (below) for help.)

3. Write a general statement that includes the topics of each paragraph. This is your statement of the topic.

If you need to relate paragraphs to the topic of the passage, use the guidelines below.

"Relationship Sheet"

HOW ARE PARAGRAPHS RELATED TO A TOPIC?

1. The paragraph may restate the main idea of the passage in different words. The main idea of the passage as a whole and the main idea of the paragraph may be IDENTICAL. Sometimes, two paragraphs say the same thing in different words and thus would share the same main idea.

2. Different paragraphs may contrast the main idea of the passage with other ideas. The paragraphs might compare two ideas, presenting features of each. In short, look for comparisons and contrasts of ideas.

3. Different paragraphs may present examples of the main idea of the passage. A paragraph may talk about an idea which is part of or a type of the idea which is discussed in the passage.

4. Some paragraphs present a principle. Other paragraphs may give reasons for this principle. These other paragraphs may present evidence which supports the principles.

5. Paragraphs presenting a principle may also be followed by paragraphs telling about the results of the actions or ideas stated in the principle.

6. Paragraphs may <u>describe</u> or <u>qualify</u> the main idea.

7. Paragraphs may develop <u>subtopics</u> of the main topic of the passage. Each paragraph would thus be related to the main idea by being <u>a part</u> of it.

These seven relationships between paragraphs and the topic of the passage are just several of many you can figure out. They are the major relationships and should help you find out how the author organized the material.

APPENDIX B

MEMORIZATION SKILLS MODULE

94

MEMORIZATION SKILLS

The Objective for this lesson on Memorization Skills is:

    You will be able to increase your skills in memorizing

    information by using mnemonics such as elaboration,

    mental pictures and grouping.

Research has discovered that people are <u>active</u> learners. They actively work with and think about the information that they are trying to learn. In the past, we've considered people to be almost like containers that just sit still and fill up with information. We've thought that students had to just sit there while teachers filled their heads with new facts about a subject. But that's not true. When someone tells us something or when we read something, we <u>think</u> about it; we remember some parts better than others, and we usually learn things that are interesting and familiar to us much quicker and better than things that aren't interesting and familiar to us personally.

Another interesting fact is that we're all students and we will always be learning new things each and every day. In fact, sometimes we learn a lot more than we think we do. For example, if you have a favorite football or baseball team, you have probably learned some, if not all, of the players' names and positions. You've learned the names and ranks of your friends since coming into the military, and you've learned your way around this base. We all learn new things every single day--yet some learning, especially learning technical material from manuals and notes, can sometimes be difficult, boring, and frustrating.

But do you want to know something exciting? It doesn't have to be like that--it can be fun. Much of the research that has been done on memorization skills has shown that there are easier and faster ways of remembering infor- mation--and that's what you'll be learning--ways to help yourself be better at the task of learning new information.

Actually, there are many examples of learning aids which you have probably used for years--even though you didn't realize that what you were doing was helping yourself learn something more easily. One of the first aids that you probably ran into and put to good use was the alphabet song--A, B, C. D, E, F, G, ... This was a learning aid because it made the alphabet easier to learn and to remember, and that was pretty hard to do when you were five or six years old.

Another learning aid for those of you who were into music was the phrase "Every Good Boy Deserves Fudge" to stand for the lines of the treble staff (E, G, B, D, F). So, you see, what we'll be doing is not entirely new to you: what is new is the way we'll be using these ideas.

The proper name for these learning aids (tricks, skills, methods or what- ever you want to call them) is MNEMONICS (ne̅-mon-ics) or MEMORY AIDS. In this lesson, we will tell you about three kinds of Mnemonics: elaboration, mental pictures, and grouping.

Elaboration helps you remember things by using information that you already know. For example, some students have learned to spell the word "ARITHMETIC" by remembering the sentence, A Rat In The House May Eat The Ice Cream. In other words, if you put together the first letter of each of the words in

this sentence, you will have spelled the work "ARITHMETIC."

Another example of the use of elaboration is the sentence which many people use to remember the color code for resistors. The code is:

```
0 = Black
1 = Brown
2 = Red
3 = Orange
4 = Yellow
5 = Green
6 = Blue
7 = Violet
8 = Gray
9 = White
```

Remembering these colors, in this order, might be a very hard thing to do for most of us. By using an elaboration sentence however, it becomes much easier: Bad Booze Rots Our Young Guts But Vodka Goes Well. Again, if you put together the first letter of each of the words in this sentence, you will have listed the first letter of each color in the resistor color code.

A somewhat different example of elaboration would be when you arrive at a new base and are trying to remember where certain buildings are located. For example, let's suppose that you just got to your next assignment and wanted to remember where the following buildings were located.

Swimming Pool	-	River Blvd.
Hobby Shop	-	Carswell Blvd.
Airman's Club	-	Highland Street
Commissary	-	Locke Street
Theater	-	Silver Street
Snack Shop	-	French Blvd.

You could remember that the Swimming Pool was located on River Blvd. by remembering that both the pool and a river contain water and that probably somewhere along the line the water that is in the swimming pool was once in a river.

Another example would be to connect the Hobby Shop with Carswell Street by remembering that your favorite hobby (or the favorite hobby of someone you know) is working on your car. You could remember that the Theater was located on Silver Street by remembering that it takes money (silver?) to get into the theater. Finally, you could link the Snack Shop with French Blvd. by remembering that french fries are served at this place.

Let's look at the rest of this list. Once more, what you need to do is to think of some way to bring the two words together so that you can remember the street name of the shop. What would some elaborations be for these pairs?

Airman's Club	Highland Street
Commissary	Locke Street
Gym	"A" Street
PX	Main Street

Remember, what you are doing is using things that you <u>already know</u> to help you learn what you are trying to remember.

<u>Mental pictures</u> is the second kind of mnemonic that we are going to tell you about. Basically, this memory aid helps you to link together words and ideas by making pictures in your head. For example, AFM 127-100 is the Air Force Manual on Explosive Safety; AFM 127-101 is the Air Force Manual on Ground Safety. You can remember that the Explosive Safety manual is number 100 by remembering that you can make the number 100 into a picture of a shotgun by drawing in a few lines.

AFM 127-100

Thus, you can remember that AFM-127-100 is the manual on Explosive Safety as pictured by the shotgun and the idea that guns cause explosions. If 100 is the manual on Explosive Safety, then 101 has to be the manual on Ground Safety.

Another example of how mental pictures could be used to help you remember something is when you have to remember the military label for certain pieces of equipment. For example, M23 is an Igniter. You could remember this by picturing 2 or 3 Matches striking against each other to Ignite a bomb or a stack of papers. You could remember that BLU-27A/B is a Fire Bomb by remembering that BLU sounds like Blewey and picturing 27 Active Bullets going Blewey.

You could also use mental pictures to help you remember the locations of the buildings on the new base that we talked about earlier. For example, since both swimming pools and rivers contain water, you could picture a swimming pool being filled up with river water. In these days, rivers are often not very clean so you might picture the swimming pool filling up with not only water, but beer cans and fish and tennis shoes.

Think about how the idea swimming pool and river might be connected for you. It's very important to really think about your picture or story. Picture it clearly in your mind. You can make your picture as detailed and silly as you want because the more you think and concentrate, the better you will learn.

Remember, what we're doing is making up a mental picture or story which shows two things doing something with each other. If someone walked up to you and said, "Hey, where's the swimming pool?", you could picture in your mind a dirty swimming pool with a lot of people in bathing suits standing around the pool holding their noses and then you could say, "The swimming pool is on River Street."

Let's take another example: "Hobby Shop - Carswell Blvd." The Hobby Shop has many different kinds of tools and equipment. One thing which a lot of people use the Hobby Shop for is to work on their cars. Thus, you can connect hobby with car repairs. A good picture of this might be a big building with several open garage doors across the front and the words "Hobby Shop" painted above those doors. You can see people in each of those stalls working on their Jaguars, their Ferraris and their Porsches. In other words, when you decide to go to the Hobby Shop, you picture all those fancy cars in the Hobby Shop and know that you need to go to Carswell Blvd.

Let's look at the rest of the list. What are some good, active mental pictures for:

Commissary - Locke Street	Commissary is like a Safeway; a safe has a locke.
Airman's Club - Highland Street	Airman's Club/booze/high
Theater - Silver Street	Theater/The Silver Screen
Snack Shop - French Blvd.	Frenchman going to Snack Shop

Another example of the use of mental pictures to remember things is called "one is a bun." It is a rhyming memory aid used to learn lists of things in order. You'll understand what we mean in a few minutes. Right now, look at the following number-words rhymes.

One   - Bun

Two   - Shoe

Three - Tree

Four   - Door

Five   - Hive

The first step in using this memory aid is to remember which words go with which numbers. That should be easy since you might already know two of them from this rhyme out of your childhood: one-two, buckle your shoe; three-four, shut the door; five-six, pick up sticks; seven-eight, close the gate; nine-ten, a big fat hen. They all rhyme in a way that's easy to remember.

Take a few minutes now to learn the words that go with the numbers. Once you know the words, we'll show you what to do with them. Use a pencil and paper to test yourself. Go ahead; if you have any questions, just ask your instructor.

The next step in using this memory aid is to get your imagination working. Once you've done these two things, the rest is fun. Here's an example. There are five leading brands of beer in San Antonio, Texas, according to sales volume:

> Lone Star
>
> Pearl
>
> Coors
>
> Budweiser
>
> Schlitz

What we're going to do is to learn this list of beer brands, in order, using the memory aid "one is a bun," so that if we asked you, "What is the 3rd largest selling beer in Texas?", you would be able to remember that it was Coors right away.

Okay, here's how you do it. You've learned the words that go with the numbers 1 through 5. One-bun, two-shoe, three-tree, four-door, five-hive. Now comes the fun part - using your imagination. Number one on the list is Lone Star. In the rhyming memory aid, the number one is a bun. Now, get a really clear picture in your mind in which a bun is doing something with Star. Picture an active scene, one that's really doing something. For example, it would be okay to imagine a star between two halves of a bun--a star sandwich--but it would be even better to imagine someone that you don't especially like biting down into a tin star sandwich, breaking all of his or her teeth. Give this a try; close your eyes and get this picture as clearly in your mind as possible--someone sitting in the snack bar with a star sandwich; he bites down on it, his teeth crack and break; boy, he looks silly. The important parts of this picture are the bun and the star. This might sound kind of silly but there's a good reason for that; it is kind of silly and that helps you to remember it.

The idea is that beer brand #1 is Lone Star. Since one is a bun, we want to put Star and Bun together. If I ask you, "What's the number one selling beer in San Antonio," you would think, "one is a bun" and then picture, in your mind, the scene that you imagined which put star and bun together. Another example of what you might picture could be a great big star, sitting at a table in a nice restaurant eating a hamburger bun the size of a truck tire. Remember, make your mental picture an active one; make it a crazy one if you want to; make it one you'll be sure to remember.

Let's look at #2--Pearl. Remember now, two is a shoe, so you want to

102

imagine a _shoe_ _doing_ something with a pearl. For example, you could
picture a large white pearl with skinny legs marching in a parade, wearing
a pair of bright orange shoes which are bigger than the pearl itself. Or
you might imagine a great big shoe, the size of a house, falling from the
sky and crushing a white pearl the size of a man. Again, give this a try.
Close your eyes and imagine a man-sized pearl sitting in the middle of a
field. All of a sudden you see a house-sized shoe falling from the sky
and smashing the pearl into a million pieces.

Again, this sounds crazy, but that's good. You see, the sillier, more
active, the better, because it helps you to remember. If I asked you,
"What's the number 2 selling beer in San Antonio," you could say to
yourself, "_two_ is a shoe, and you could quickly remember that _pearl_ being
smashed by the monster shoe from the sky. The answer would be Pearl.

Let's practice this a little more because it's important. Remember, in
this example, our final goal is to learn the five leading beers in San Antonio,
in order. Now not all of these beer brands will be that easy. You may need
to change the beer name a little in order to get a picture of it. For example,
number 3 on the list is Coors, yet the word "Coors" doesn't really call up a
picture like star and pearl do. But if we find a word similar enough to
Coors, it will still work. For example, by changing the _first_ letter from
"C" to "L", we have "Loors"--like fishing lines. So your mental picture
can have a tree (_three_ is a _tree_) doing something with lures, which sounds
enough like Coors to help you to remember that brand #3 is Coors.

Again, then, imagine a scene in which a _tree_ is doing something with a
fishing lure. You might picture yourself casting into a river and getting

103

your lure tangled up in underwater tree limbs, but it would be even better to picture a scene in which you cast your favorite fishing lure, and just before it hits the water, a tree jumps out and grabs your lure and stuffs it into its mouth. When I ask, "What's the third largest selling brand of beer in San Antonio, you could remember that "three is a tree" and remember the image of a tree grabbing your lure and that would be enough to remind you that #3 is Coors.

Let's go on to #4 - Budweiser. Again, we'll need to do something with the word. How about using Bud Man? Since four is a door, we need to have a scene in which a door is doing something active and exciting with Bud Man. Close your eyes and create an active picture of a door and a Bud Man.

How about #5--Schlitz--five is a hive?

Now, to make practical use of what we've done, try to recall the list in order. You can do this by thinking of brand #1--"One is a bun"--and then thinking of the image that you imagined that included the bun. Ours was a star sandwich breaking some teeth. Likewise, two is a shoe. We remember the shoe crushing the pearl.

Three is a tree - (grabbing the lure) - Coors

Four is a door - Bud

Five is a hive - Schlitz

That's all there is to it. You've learned the list in order, and although this list was pretty easy, it works just as well with longer lists and more difficult items, like for example, the types of things that you might be expected to learn out of a tech manual.

Putting elaboration and mental pictures together is something which a lot of students find useful. The following example will show you how this is done. Picture yourself in the following situation. You've borrowed a friend's private apartment for the evening. You have a date with a special someone and you've promised the "wine and dine" treatment at the apartment before a late movie. Here's your shopping list.

Wine

Crackers

Cheese

Charcoal

Charcoal Lighter

Steaks

Potatoes

Corn on the Cob

Lettuce

Tomatoes

Green Onions

Cherry Pie

There's really no need to have to write down a list of any kind, even one this long or longer. By using mental imagery and elaboration together you can imagine your evening's progress in your mind while actually shopping for your groceries. Your fantasy might go like this--the doorbell rings, that special someone comes in and the first thing you do is offer a glass of wine (Ah, Ha, wine is #1 on the list). While you are talking, you offer the cheese and

crackers (#2 and #3 on the list). After a little while, you start the fire (charcoal and charcoal lighter, #4 and #5). When the fire is ready, you put the steaks and potatoes on to cook (#6 and #7); while that's cooking, you put the corn (#8) on to cook and ask your special friend to make the salad out of lettuce (#9), tomatoes (#10) and onions (#11). Now picture yourself at the table. As you look at your plate, all of your food items are visible--steak, potatoes, corn on the cob, and salad. Of course, you'll serve the cherry pie (#12) for dessert. You've memorized your list without really trying.

Grouping is the third type of mnemonic that we want to tell you about. This learning aid is based on the idea that breaking long lists into smaller pieces makes them easier to remember. For example, your social security number contains nine numbers. If you had to remember those specific nine numbers in the correct order it might be kind of difficult. Most of us, however, find it easy to remember our social security number by breaking it down into three groups of numbers; the first group contains three numbers, the second group contains two numbers, and the third group contains four numbers. Thus, 523-00-2620

Another everyday example of grouping is telephone numbers. Telephone numbers contain seven digits and that by itself might make it hard to remember. We break those seven numbers, however, into two groups and that makes it easy to remember: 394-4276.

Grouping can also be used to remember the steps of a specific procedure. For example, the procedure for loading a bomb onto an aircraft is very complicated. It is easy to remember, however, if you break this procedure down into five steps: (a) Prepare Aircraft; (b) Prepare Munitions; (c) Loading;

106

(d) Fusing; and (e) Inspecting. You can then use elaboration to remember

this procedure. For example, using the first letter of each of the words in

the procedure, you can make P-A-P-M-L-F-I. You can remember PAPMLFI by putting

these letters into a meaningful sentence: Powder And Power Means Lots of

Fuming Ignition. In other words, the procedure for loading a bomb onto an

aircraft is PAPMLFI or Powder And Power Means Lots of Fuming Ignition.

Since we've covered a lot of new ideas in a short period of time, let's

review. We've talked about three different types of mnemonics that can

really help you learn new material and information more easily and quickly.

These were:

1. Elaboration - making sentences, stories, etc., which make new ideas

and information more meaningful to you by relating them to what you already

know. Remember the example of the Snack Shop on French Street (french fries).

2. Mental Pictures - making pictures in your head which connect words

and ideas. Remember the example of the five leading brands of beer in

San Antonio, Texas.

3. Grouping - breaking long lists or procedures into small pieces and

then using imagery and elaboration to learn the items. Remember the example

of the procedure for loading a bomb.

These memory aids are useful in remembering your grocery list as well as

remembering technical information. If you think about it, most of the new

information you are expected to learn and remember involves things that you

read--paragraphs, lessons, chapters, etc. The next time you sit down to study,

try using elaboration, mental pictures or grouping to remember this new material.

If it seems that these methods may take more extra time than they're worth, keep in mind how much time is wasted when you're not sure you remember what you've read and you either reread the material, take lots of notes, or fool yourself into believing you know the material and then do poorly on the test and have to study the material all over again. Moreover, the extra benefits of making your studying more fun should make your efforts well worth it!

APPENDIX C

*CONCENTRATION MANAGEMENT

CONCENTRATION MANAGEMENT

The objectives of this lesson are:

1. You will be able to identify the difference between good study moods and bad study moods.

2. You will be able to use proper methods for changing your bad study moods into good study moods.

Creating A Good Mood

Most of you know that when you're in a good mood, studying seems to go more easily, you can do more work in less time, you feel better, think better -- all those good things. What's less well known is that you can do something to change your mood. We've found that many people think moods are determined by situations outside of their control. This simply is not true. MOODS ARE CONTROLLED BY WHAT WE THINK OR TELL OURSELVES.

Let's look at some feelings that make up "bad" study moods--those moods that hurt our studying--and some feelings that make up "good" study moods.

Feelings associated with bad study moods are: anger, fear, boredom, stress, sleepiness, self-pity, guilt, and lack of self confidence. We've probably all experienced these at some time or another during studying and we all know these feelings can destroy a good study mood. Often we just quit. Sometimes we stick with it but make very little progress because we are tired and feeling uptight. Sometimes we can force ourselves to ignore these feelings but they get in the way of our learning anyway. They slow down our thinking and often cause us to daydream or get confused.

Feelings associated with good moods--happiness, excitement, fulfillment, hope, confidence, alertness--can lead to a good or poor study mood, depending

on whether or not the feelings become related to studying itself. For
instance, if you're excited about what you're reading, you are into
your work. But if you're excited about what you're going to do later
that evening, you're probably in a bad study mood--"bad" meaning the feel-
ings lead you away from a good, useful, and productive study session.

In short, what are usually considered good feelings, such as happiness
or excitement, are not feelings that make a good study mood if they are not
tied to what you are studying. Thus, you may be feeling happy and still be
in a "bad" study mood, if your happy feelings do not have anything to do
with what you are studying.

Probably the most ideal or best study mood is one in which you are
relaxed yet alert. Your head is clear of the problems and tensions of the
day. You are full of energy and ready to begin. Fortunately, you can
create this mood for yourself.

Research has shown that when you <u>expect</u> something to happen in a certain
way you often do things without thinking to make sure that your <u>expectations</u>
come true. This would mean that if you think you are going to have a bad
time studying, you will automatically (unconsciously) do things to make
yourself unhappy so that your expectation will come true. This same thing
happens over and over again in almost everyone's life. If you have built up
the idea that you are not very smart, then you will do things to make sure
that this idea comes true: You will value your thoughts less, become overly
upset when you have a problem in your thinking, and do poorly on tests. This
is what is often meant by the "self-fulfilling prophecy."

The result of all this is that you may be caught in a no-win game that
makes your studying and learning unhappy and unproductive. Your negative

111

beliefs or feelings about yourself, about learning, about education, and about knowledge can cause you to have negative experiences in learning. These then add more support to your negative beliefs and feelings. And around and around you go--getting nowhere.

How do you get out of this? One way is to carefully look at what you feel and believe about yourself and also what you feel about school and knowledge. Looking at these feelings and how they are connected with your life goals can sometimes bring about changes. Many thoughts about school and your ability to perform in school were made when you were young. If you are like most people, these thoughts were not made in a logical way. They were made from a lot of different experiences and conversations. Most people have never taken the time to really look at their feelings and where they came from. Once you start doing this, you often find that many thoughts don't make sense or are out-of-date. Developing attitudes and beliefs that are in line with your goals and recent experiences can help your learning be a more enjoyable experience.

So, one set of things to talk to yourself about is your attitude toward learning, thinking, and school, and your attitudes toward your abilities and motivation. Develop productive attitudes and your study sessions will probably become more pleasant and useful. You will begin to use the time you spent studying to get the most of the material--without wasting time.

In summary, your mood toward studying begins before you ever sit

down with your book. The things you tell yourself about school, and

your abilities and interests, form your attitude or mood. This attitude

or mood will then determine whether or not you are able to study. The

way to deal with this is to examine what you say to yourself before

starting to study.

If all of this seems a little unclear, read on. We are going to show

you how to set a good study mood and how to keep a good study mood. We

will do this by having you do some concentration exercises. These exercises

will show you how to turn a bad study mood into a good study mood. In other

words, you will read a sentence or two about the thoughts of a student who

is in a bad study mood and then you will write down how to talk yourself out

of this bad mood if you were that student.

Before we get into these concentration exercises, we want to say some-

thing about relaxing. Earlier in this lesson we said that the best study

mood is one in which you are relaxed yet alert. Some students say that they

get uptight every time they sit down to study. These same students also

tell us that they don't know how to let themselves relax.

When you find yourself becoming tense or uptight you can let yourself

relax by taking in a very deep breath, holding it for two or three seconds,

and then very slowly letting it out. It is often best to repeat this deep

breathing exercise one or two times. A lot of students have found that

113

slowing down their breathing like this slows down their heart rate and this reduces their feeling of being uptight. The following procedure gives you the exact steps for Slow Deep Breathing.

SLOW DEEP BREATHING

1. Take your attention completely away from the studying for 20 to 30 seconds. A few seconds won't cost you anything, and it may gain you much.

2. Settle back or slump into a position in the chair that is as comfortable and relaxed as possible. Close your eyes.

3 Relax all the muscles of your body. Don't do a halfway job, relax entirely and all over. Don't try to relax so much as just let go of all muscles and tension; let them go loose and heavy. Some people help this along by first tensing all their muscles in that comfortable sitting position, holding the tension for about five seconds (throughout the body) and then letting go and relaxing all muscles entirely.

4.* Having let go and relaxed, take in a very deep breath and hold it for a few seconds, then very slowly let it out. Repeat this once or twice, keeping your eyes closed.

5. You can deepen the relaxation and help relax away feelings of tension by thinking silently to yourself the words "calm" and "relax" as you slowly let out your breath. Think or picture these words to yourself as you slowly let out the breath.

* Step (4), taking slow deep breaths, is the most important step. The other steps have to do with setting the stage and practice.

TIMES FOR CREATING A GOOD MOOD

There seem to be three times when your mood or negative thoughts can really get in the way of studying. One is when you are trying to decide whether or not to study; Two is when you sit down to study and you have a lot of other thoughts and feelings in your head; and Three is during your study

session. The following exercises are divided into these three categories.

These exercises were written to help you practice talking to yourself--taking control of the problem and finding a good solution. In other words, when students, like yourself, are having a bad study mood they say things like, "I hate this course" or "Every time I even think about studying, I get _so_ tense." This is their "old self" talking. It is putting them in a bad study mood and letting their moods control them. Their "new self," who is trying to control those moods and create a good study mood, says things like, "This course may be boring but your job in the military isn't. It's up to you to get the most out of this course and prepare yourself for your next assignment."

In other words, the "new self" and the "old self" talk to each other and try to win the student over to their side. If the "new self" wins, the student will be in control of his or her moods and will probably get a lot out of this course. If the "old self" wins, the student will lose control of his or her moods and will probably not get a lot out of this course.

Your job for these exercises then is to read the statement of the "old self" and then write down what you would say to yourself if you were that student and wanted the "new self" to be in control of your mood. Use your own words <u>as if you were talking to yourself</u>. Then look at the "new self" statement which other students have written. If you think your answer could be improved, please rewrite it. This exercise is written to help you develop your skills in spotting a poor attitude or bad mood (old self) and then knowing how to talk yourself into a good mood (new self).

Exercises For Problems Which Occur Before You Start To Study

I HATE THIS COURSE!

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_____

Okay. This course may be boring but your job in the military isn't. It's up to you to get the most you can out of this course and prepare yourself for your next assignment.

EVERY TIME I EVEN THINK ABOUT STUDYING, I GET SO TENSE!

_____

_____

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_____

That's the time you need to work on your attitude. You can make a list of what you need to do. That will make you feel less up-tight because you can check things off the list as you finish them--and that will make you feel like you're getting someplace. You can relax as you think about studying, expecting some tension and dealing with it.

WHENEVER I'M FACED WITH STUDYING, I SHARPEN PENCILS, DUST MY DESK, GATHER
MY MATERIALS, ETC., AND CAN'T SEEM TO GET ON WITH THE TASK.

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You could limit these "beginning" behaviors to 5 or 10 minutes and work
on your attitude (by relaxation and good self-talk) while you're doing them.
You could get yourself excited about studying while you're getting your
stuff organized.

I'M SO UPSET. MY ROOMMATE WAS DISCHARGED. MY DAD LOST HIS JOB. I JUST
CAN'T WORK WITH ALL THESE PROBLEMS ON MY MIND.

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_____

You really need to go off for awhile and relax. First, you should talk to
your roommate and Dad and tell them how concerned you are and that you wish you
could help. Allow yourself a definite amount of time for this and then
come back and begin studying. Reward yourself for accomplishing small
things and calm yourself when necessary by doing the Slow Deep Breathing
exercises.

117

I'VE HAD A REALLY HARD DAY TODAY AND DESERVE A BREAK. THIS COURSE IS A
WASTE OF TIME ANYWAY.

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You're just making excuses for not studying. In the long run, it won't do
you any good to put off studying. You need to get into a good study mood,
relax and get to it.

I NEVER HAD TO STUDY IN HIGH SCHOOL, WHAT'S WRONG WITH ME NOW?

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_____

Military technical training is a little tougher than high school. You
wanted to challenge and improve yourself, so here you are in the military.
You want that job, so let's get on with it.

I COULD STUDY IF I WEREN'T SO FRUSTRATED!

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_____

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Maybe you should figure out why you're frustrated. Maybe it's because you
don't seem to be getting your work done. Feeling frustrated only makes
the situation worse so perhaps you need to work on your attitude. Also,
you need to break this lesson down into smaller parts and reward yourself
for each step forward! You may need to take a break to work off some of
this tension. Maybe you should jog for a mile or two. You can think about
your situation while you're jogging and set a plan for getting back to work.

IF I WEREN'T UNDER SUCH TIME PRESSURE, MY ATTITUDE TOWARD STUDYING WOULD
BE BETTER!

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Maybe your attitude gets you into the situation in the first place. If
you had a more positive attitude you might get your work done faster and
better. Take control of your attitude by listing tasks to be done and
telling yourself you are going to do the work.

The message which comes out of all of this is pretty simple. It is also the most important part of any method for improving a person's life: Change the way you think (talk to yourself) and you will change the way you feel. Talk to yourself in a more positive, productive way, and you will start to feel better. Once your experiences are more positive, the number of negative thoughts you have will decrease.

Now, you've learned how to get yourself to start studying. You've sat down with your books but your head is sometimes full of all kinds of thoughts desires, and memories. You can clear your head by relaxing and talking to yourself just like you did to get yourself to start studying. The following concentration exercises deal with how to spot and change thoughts which lead to a bad study mood when you sit down to study.

Exercises For Spotting And Changing Thoughts Which Lead To A Bad Mood When You Sit Down To Study.

Below are some thoughts which students have had when they sit down to study. Read the "old self" statement and then write down what you would say to yourself if you were that student and wanted to get into a good study mood ("new self"). Use your own words as if you are talking to yourself. Then, look at the "new self" statements other students have written. If you think your answer would be improved, please rewrite it. This exercise is written to help you develop your skills in spotting a poor attitude or bad mood ("old self") and then knowing how to talk yourself into a good study mood ("new self").

I AM SO UPTIGHT! I CAN'T SIT STILL! MY NAILS ARE CHEWED DOWN TO THE
QUICK AND I'VE LICKED MY LIPS SO MUCH THAT THEY'RE CHAPPED!

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Well, you usually get uptight when it's time to sit still and study. You
could do some physical exercise for a few minutes, I guess. You will
probably settle down if you just _relax_ and get into the task.

IT SURE IS NOISY IN HERE!

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_____

_____

You need to stop listening to everyone else's talking and stop watching the
door. If you just get into the course material you won't hear all that any
more. You need to re-set your mood.

I KNOW THAT I SHOULD RELAX AND SET A GOOD STUDY MOOD BUT THAT WILL MAKE
ME SLEEPY.

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Where will you be if you don't set the mood? Besides, if you do get sleepy,
you can get going again by Slow Deep breathing or by doing some physical
exercises.

121

Finally, few of us go through a study session without losing our concentration once or twice. Sometimes the things distracting us are things related to our studies. Most of the time, however, the distractions are not related to what we're studying. Our job is to cope with these. Let's look at some of the distractions which students often experience during study sessions.

Exercise For Coping With Distractions During Study Sessions

Below are some thoughts which students have had during their study sessions. Read the "old self" statement and then write down what you would say to yourself if you were that student and wanted to get into a good study mood ("new self"). Use your own words as if you are talking to yourself. Then, look at the "new self" statements other students have written. If you think your answer could be improved, please rewrite it. This exercise is written to help you develop your skills in spotting a poor attitude or bad mood and then knowing how to talk yourself into a good study mood ("new self").

BOY, I BETTER NOT FLUNK THIS NEXT TEST LIKE I DID THE LAST ONE.

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You're not going to flunk the test because you're using the new study methods which your instructor showed you. Keep on trying!

THIS TEXT COULDN'T BE HARDER TO UNDERSTAND. THE MATERIAL WOULD BE
INTERESTING IF I DIDN'T HAVE TO WORK SO HARD TO GET IT.

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At least the material's interesting! You better do something to it so it
will make sense to you. Maybe a network would help. (See the lesson on
Reading Comprehension.) You could pretend you're an editor--and write
it in your own words--it might be fun! You know that would help you under-
stand it better.

I'M STARTING TO DAYDREAM. IT'S SO HARD TO CONCENTRATE ON THIS STUFF.

_____

_____

_____

_____

Okay. You'd better straighten up now before you give up! What's bothering
you? I think I'm tired because this material is so hard. You need to break
this up into smaller parts and then reward yourself for getting each part
learned and staying calm and controlled.

I CAN'T WAIT TILL FRIDAY! THE PARTY IS GOING TO BE SO SUPER!

_____

_____

_____

_____

Friday's a long way off! You have a lot to do in the meantime. Besides,
if you get behind schedule between now and Friday you won't have as much
fun at the party - so get with it!

THIS ROOM IS SO DEPRESSING!   I COULD STUDY IF I WERE IN MY ROOM AT HOME.

_____

_____

_____

_____

If you have to study here, you have to train yourself to concentrate in
spite of the setting. You can find something nice about it or simply ignore
it. You can get into studying by setting a good mood.

THIS IS SO HARD!   I DON'T SEE HOW IT HAS ANYTHING TO DO WITH THIS COURSE!

_____

_____

_____

_____

Maybe you can make a game out of this! You need to find out how it links
up with what you learned yesterday. Maybe you could talk to some other
students or the instructor.

Yes, it's hard but it will be easier the next time you go over it. You
may need to understand it more deeply before you can see how it connects with
the whole course.

I DON'T UNDERSTAND THIS. MY EYES ARE JUST PASSING OVER THE PAGES.

_____

_____

_____

_____

Okay. What's the problem? Don't just say you don't understand this as
if there's nothing you can do about it! Figure out what's wrong. (See
lesson on Reading Comprehension if you need help figuring out what's wrong.)

I'VE GIVEN THIS MY BEST SHOT AND I STILL DON'T KNOW IT.

_____

_____

_____

_____

Try the instructor. That's what s/he is there for. Go on!

ACCORDING TO MY SCHEDULE I ONLY HAVE 20 MINUTES LEFT, SO I BETTER HURRY!
NOW, ALL I CAN THINK ABOUT IS HURRYING!

_____

_____

_____

_____

There's no point in worrying about the time. You need to complete the
"goal" as best you can. You can always add on to tomorrow's schedule.
Doing a good job of this is more important than being "through" and
having nothing to show for it!

IF I DON'T MAKE A GOOD GRADE ON THE TEST I'LL KNOW WHAT PRESSURE REALLY
IS! EVERY SENTENCE I READ LOOKS LIKE IT MIGHT BE A TEST QUESTION!

_____

_____

_____

_____

If you keep worrying, you will flunk! You need to understand that even if
you were to mess up on this test, there's always another chance. Chances
are you'll do well because you're studying now. Looking at sentences in
terms of possible test questions is good practice for the test if you'll
just relax.

SUMMARY

In other words, you are your own coach, so remember that a good coach MOTIVATES you when you're acting tired, bored, lazy, and generally want to blow it off.

How?	By telling you to FIRE UP:	"Okay, let's get with it."
	By telling you to KEEP GOING:	"You'll feel better if you finish this section."
	By REWARDING:	(celebrate small things!) "Good you're on the right track now!"

A good coach also RELAXES you when you're acting tense, uptight, frightened, angry, frustrated or losing your state of "relaxed attention."

How? By telling you to RELAX: "Take it easy" "Just stay calm." "You'll do ok." "Conserve your energy now." "Do some Slow Deep Breathing."

A good coach DIRECTS you by giving you positive ideas or hints about how to improve your learning.

Examples: "You are not reading carefully now--you didn't get that. Go back and think!"

"You're getting off the track. Get back to it." "Slow down-- better read this more carefully." "This is important."

"Do you understand that?"

"Are you getting the Big-Picture? Do you understand how that relates to the course?"

And a good coach LEAVES YOU ALONE when things are going well.

In case you find that coaching yourself into a good study mood is easier said than done, a worksheet has been included at the end of this lesson for you to use to write down what happens when you lose your good study mood (concentration) and how you talk to yourself to get back on track.

TO SUM UP: YOU CAN <u>CREATE</u> A "GOOD" STUDY MOOD BY

    (1) TALKING YOURSELF OUT OF STATEMENTS WHICH LEAD TO A BAD MOOD.

    (2) RELAXING.

    (3) BEING IN <u>CONTROL</u> OF YOUR SITUATION (WHICH MEANS DOING (1) AND

        (2):)

DO THIS <u>WHEN</u>: (1) YOU ARE TRYING TO DECIDE IF YOU SHOULD STUDY

           (2) WHEN YOU BEGIN TO STUDY

           (3) DURING YOUR STUDYING

What Made You Lose Your Concentration?

What Made You Lose Your Concentration?	How did you feel?	What did you say to yourself?	Was it Productive? (leads you toward your goal of having a good study session)	What could you have said/done?
1. Setting (Noise, Temperature)	a. Uptight? ___	___		
2. Stress/Feeling Poorly	b. Frustration? ___	___		
3. The Material (Difficult, Boring)	c. Sadness ___	___		
4. Judging My Work	d. Fear of Failure? ___	___		
5. Daydreams/The Future (Test test, grade average, etc.)	e. Uncertainty? ___	___		
6. Other	f. Anger? ___	___		
	g. Other? ___	___		

128

What Made You Lose? Your Concentration?	How did you feel?	What did you say to yourself?	Was it Productive? (leads you toward your goal of having a good study session	What could you have said/done?
1. Setting (Noise, Temperature)	a. Uptight?			
2. Stress/Feeling Poorly	b. Frustration?			
3. The Material (Difficult, Boring)	c. Sadness			
4. Judging My Work	d. Fear of Failure?			
5. Daydreams/The Future (Test test, grade average, etc.)	e. Uncertainty?			
6. Other	f. Anger?			
	g. Other?			

APPENDIX D

TEST WISENESS MODULE

TEST WISENESS

The objectives of this lesson are:

1. You will be able to use methods for completing tests on time without giving up any accuracy.

2. You will be able to carefully read and understand test directions and test questions.

3. You will be able to use good methods for figuring out how and when to guess on test questions.

4. You will be able to use logical reasoning to answer test questions when you are not sure of the correct answer.

5. You will be able to understand that test anxiety is a habit; a hard-to-control feeling of fear of tests and thinking about tests.

6. You will be able to use specific methods for controlling most of the test anxiety which you might have when you sit down to take a test.

Test taking is a skill just like studying or hitting a golf ball or swimming. We have all known of times when two people get the same score on the same test even though one of them knew a lot more about the topic than the other one. This is probably because one person had better test taking skills, more experience in test taking, or less test anxiety than the other person. When people taking tests have either high anxiety or poor test taking skills, their test scores will probably <u>not</u> show how much they really know about a subject.

Poor test taking skills and high test anxiety can both be corrected if a person learns more about the skills used in taking tests. This lesson

131

on Test Wiseness was written to teach test taking skills--the ability to use clues in the test to get a score which really shows how much a person knows about a specific subject.

Before telling you what test-taking skills really are, it is important to clear up three rumors. First, some people believe that test-taking skills are a way to "beat the test." Other people think that test-taking is a natural ability and cannot be taught or learned. Finally, others believe that these skills are of no value because they believe that tests measure only what a student knows. All three of these beliefs are incorrect as the following paragraphs will show you.

1. Beating the Test

This rumor comes from the idea that taking a test is a game of chance: the test has been written to fool the student, and therefore, the student has to figure out the "code" or "gimmick" in order to get a good grade.

To show that this idea is not correct, ask yourself a couple of questions. First, "Why would anyone who wanted to know how much knowledge or ability students had in a specific subject write a test which measured something else--like the student's ability to out-guess the teacher?" Second, "If the test was written to measure knowledge of a specific subject, isn't it pretty risky to not learn the material and only try to out-guess the instructor?" That is, test wiseness is no substitute for knowledge. It is also not a system for second guessing the test writer or "lucking out."

2. Good Test Takers Are Born Not Made

Research has shown that people can improve their test-taking skills

through both experience and training. It appears that this skill can be learned and it can be improved; many programs to improve test-taking skills have been shown to be successful. Again, the test wiseness we will be teaching you <u>cannot</u> replace your knowledge of the course you are taking. It <u>can</u> give you the skills you need to get test scores which really show how much you know about the course.

3. <u>Test Scores Are Always Correct</u>

This rumor comes from the idea that test scores <u>always</u> give a true picture of how much a student knows. Research has shown, however, that test scores do not always show how much a student knows. For example, several studies have shown that test scores are influenced by the amount of anxiety which students feel while taking a test. In most cases, there is some <u>increase</u> in test scores if the student has a little anxiety, but higher anxiety causes the student's test scores to go <u>down</u>. Test scores get a lot worse when anxiety is very high. We can, therefore, say that when test anxiety is lowered, test scores often improve. This improvement is due to getting rid of the negative results of anxiety so that students can truly show what they know. Although we are still studying how test taking skills can lower test anxiety, we do know that the more a student knows about how to take a test, the less test anxiety he or she will have.

<u>Test Wiseness Is</u>:

Now that we have gotten rid of what test wiseness is <u>not</u>, let's discuss what it <u>is</u> and how we will help you to get and use this skill. As we said

133

earlier, <u>test wiseness is the ability to use clues in the test to get a</u> <u>score which really shows how much a person knows about a specific subject.</u>

We will help you learn to be test wise in three general ways: (1) By explaining some specific test-taking methods and giving you some general suggestions; (2) By giving you some exercises so you can practice using these methods and suggestions; and (3) By testing your understanding and knowledge of these methods and suggestions.

One more comment: Although there are two major types of achievement tests (objective tests and essay tests) we are only going to talk about objective tests. In fact, we are only going to talk about one type of objective test--the multiple choice (or multiple guess) test.

OBJECTIVE TESTS

Multiple choice questions are probably the most widely used type of objective test question. Many teacher-made tests are multiple choice and many nationally given educational and professional tests are multiple choice. For example, you will remember that the tests which you took when you entered the military were multiple choice tests. In other words, multiple choice questions can be used to measure a lot of different skills and abilities. This means that once you learn some general test taking skills, you will be able to take just about any multiple choice test with confidence and ease.

General Test-Taking Information

There are three general principles of test-taking which test-wise students understand and use. These are:

1. Time Management or the ability to pace yourself through a test so that you finish on time.

2. Careful Reading or the ability to read and correctly understand test directions, test questions, and test options.

3. Appropriate Guessing or the ability to know how and when to guess.

1. Time Management

Most tests have time limits--students can only take a certain amount of time to finish the test. When this is true, it is important for students to pace themselves so that they finish the test on time without giving up any accuracy. One way to correctly pace yourself through a test is to budget the amount of time that you spend on each question.

For example, let's suppose that a 60 question test has a one hour (60 minutes) time limit. Some simple division (60 minutes divided by 60 questions) shows that to finish the test on time a student can spend about 1 minute on each question. Now, we aren't suggesting that you clock the time you spend on each question. Knowing, however, that one minute per question is about the right speed can serve as a good way for judging your progress. In other words, if a student has completed ten questions in ten minutes, he or she is working at about the right speed. On the other hand, if a student has only completed ten questions in 30 minutes, it is clear that too much time is being spent on each question. If this pace is continued, the student will probably not finish the test on time.

As you know, some test questions are easier than others. The more difficult questions take more time than the easy ones. Usually all multiple

choice questions are worth the same number of points and, therefore, spending too much time on difficult questions can slow you down so much that your test score is greatly lowered. Thus, <u>it is important to remember that getting "hung up" on difficult items can be very costly</u>. In order to keep this from happening, a test wise student will do three things: (1) read all questions carefully; (2) if the answer isn't easily found, make an educated guess; and then (3) put a check mark next to questions that are confusing so that when the test is completed, more time can be given to the checked questions and answers changed as needed.

2. Careful Reading

If you don't read the directions for a test carefully and then lose valuable points because of it, you are likely to be very upset. Reading the directions and each test question carefully is necessary if you are to do well on any test. Careful reading is a skill which can be developed and improved. The following guidelines should help you improve your skill in this area.

A. Test Directions

Test directions tell you the <u>what</u>, <u>when</u>, <u>where</u> and <u>how</u> of good answers. If you don't understand these, the chances are pretty good that you will make silly mistakes on the test and your lowered score will not really show what you know about the subject--it will only show something about your poor reading skills. Since you can easily learn to be a careful reader, let's discuss a specific example of test directions.

<u>Example</u>: DIRECTIONS: Each of the questions below is followed by five alternative answers. Select the one that is best in each case and blacken the corresponding space on the answer sheet.

136

These directions give you the answers to each of the four question words listed above. That is, the <u>what</u> is to select the best response; the <u>when</u> is after the five suggested answers have been carefully read; the <u>how</u> is to blacken the corresponding space (a, b, c, d or e) and the <u>where</u> is on the answer sheet. <u>Considering how important it is to understand test directions completely, we would suggest that you ask yourself these four questions before you begin any exam</u>. <u>What</u>? <u>When</u>? <u>How</u>? <u>Where</u>?

Overlooking or not understanding specific key words in test directions is another problem which often causes students to lose test points. For example, words such as <u>not</u>, <u>except</u>, <u>all</u>, <u>only</u> and <u>none</u> can make a big difference in your performance if you don't understand them. Some examples of test directions that use these words are:

<u>Example</u>: No credit will be given for anything written in this test booklet.

<u>Example</u>: To change an answer, clearly erase the selection you wish to change and mark the appropriate answer. Do <u>not</u> X out unwanted answers.

<u>Example</u>: Give <u>only one</u> answer to each item.

Thus, it is a good idea to read test directions <u>carefully</u> and <u>completely</u> before starting the test. If you don't understand the directions, it is usually wise to ask the instructor for help so as to clear up any problems you have <u>before</u> it is too late.

B. <u>Test Questions</u>

Reading test questions is another area where it is important to be careful. If you don't understand what you are being asked to do, chances are pretty good that you will not give a correct answer.

137

One of the things which often confuses students is the complex way in which some questions are written. That is, some test questions, like the example below, are so short and specific that it is easy to understand what kind of information they are looking for.

Example: Who is responsible for what you learn
in this course?

    a. You
    b. The instructors
    c. The military counselors
    d. The course supervisors

Correct answer: "a"

Complexity is not a problem in this question. All you have to do is figure out which of the four options correctly answers the question.

Not all questions are that easy to understand. Due to being long or having difficult words, some test questions need to be read very carefully. For example, the following question might be one which you would want to study carefully before answering.

Example: At the beginning of a test people who have a high level
of test wiseness do the following:

    a. Answer all test items in the order given in the
test regardless of how long it takes to decide on
an answer.
    b. Set up a schedule of progress for taking the test
so as to make sure that the test is finished on time.
    c. Pay little attention to the test directions as this
is a waste of time and can be easily figured
out by the format of the test.
    d. Answer all the questions which look difficult
and then return to the easy questions.

Correct answer: "b"

Questions such as the one above are complex mainly due to their length. Students are often tempted to rush through these questions by

choosing the first answer that seems correct and not reading the other options. While the student might think that this saves time. It is likely that it will cost points because the correct answer is overlooked. In other words, it is very important to <u>read</u> <u>each</u> <u>option</u> <u>carefully</u> and then select the one which best answers the question.

Now let's look at an example of a test question which is complex because of the use of <u>key words</u>.

<u>Example</u>: A test wise student does all of the following except:

a. uses cues in the test to figure out the correct answer to difficult questions.
b. obtains a high score even though he or she doesn't know anything about the subject area.
c. reads all test directions carefully.
d. uses logical reasoning to figure out the correct answer to difficult questions.

Correct answer: "b"

Overlooking key words (such as <u>all</u> and <u>except</u> in this example) can cause students to miss questions even though they may know the correct answer. In fact, we have found that this happens so often that, <u>if writing in the test booklet is allowed</u>, we suggest that students underline or circle key words to make sure that they don't miss the true meaning of the question. If writing in the test booklet is <u>not</u> allowed, be sure to stop and make a mental note of all key words before deciding on the correct answer. Finally, it is important to remember that key words can show up in both the stem of the question or in the options of a question. Be sure to check both the stem and all options for key words before deciding on the correct answer.

Now, let's look at another example of a complex test question.

On page 29 of this booklet, there is a self test. Read each
question carefully and then decide which of the 7 test taking
skills (listed below) a student could use to figure out the
correct answer. Choose your response from the list of test
taking skills below. Do not try to answer the questions yet.
The important point now is the use of test taking skills.

a. Unreasonable options
b. Similar-conflicting options
c. Stem-option similarities
d. Information from other options
e. Specific details
f. Key words
g. Grammatical cues

Question #1.	11.
2.	12.
3.	13.
4.	14.
5.	15.
6.	16.
7.	17.
8.	18.
9.	19.
10.	20.

This question is complex because the student is asked to use new information
to answer the question. No matter how smart the student is, he or she cannot
answer the question correctly without reading and understanding this new
information (the self test questions). The student has to turn to page 29
of the booklet, read and understand each of 20 questions and then return
to this test question and select the correct response.

When you have to use specific examples, diagrams, charts or any other
kind of new information, it is very important that you know exactly what you
are looking for.

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In other words, it is very important for you to (1) carefully read
the question, (2) check to make certain that you are using the correct
example, diagram or chart, (3) find the information in the example,
diagram or chart that you need, (4) reread the question to make sure
that the example, diagram or chart fits the test question, (5) select the
correct answer.   It is important to remember that examples, diagrams and
charts are given to you by the test writer to help you select the correct
answer. Use these cues wisely and <u>don't</u>, for pete's sake, ignore them.

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Questions can also be complex due to what they ask the student to
do. That is, a question may be complex because it requires you to read a
long paragraph and then answer specific multiple choice questions.
Although the questions may be written in a simple manner, the time that it
takes to read and understand the paragraph may make the question very
hard.

Another example of this might be a multiple choice question which
requires the student to do a difficult math problem. The question itself
may be very simple but the time required to do the math correctly may
make the question very complex.

In other words, careful reading (and rereading if necessary) of complex
questions is really the only way of making a question easy to understand
and therefore, easy to answer. <u>For very complex questions, keep in mind
that it helps to break down a question into smaller, easier parts. Ask
yourself (a) what information is given; (b) what question is being asked ;
and (c) what choices for correct answers are given?</u>

141

3. Appropriate Guessing

The third general principle of test wiseness is appropriate guessing. Although most of us were taught that guessing at answers was not an OK thing to do, if you think about it, that idea doesn't always make sense. There is a zero percent chance of getting an unanswered question correct. If you can eliminate even one of the four options as being obviously wrong, your chances of getting the question correct increase to about 33 percent (one out of three).

Not only that, but as you probably know, most students find one or two questions on many tests that are asking for information which they don't know. Students have also been known to manage their testing time so poorly that they end up with too many unanswered questions and too little time. In both of these cases, it seems to us that "informed" guessing is the only reasonable way to deal with the problem.

It is important to remember that guessing need not be a "shot in the dark." That is, there are two kinds of guessing: informed guessing and blind guessing. Informed guessing occurs when a student can eliminate one or more of the options as clearly incorrect and blind guessing occurs when the student is completely "stumped" by the question. Informed guessing is, moreover, the type of guessing which is most likely to pay off in the way of a correct answer. For example, if there are 4 options and a student can eliminate two of them as being clearly incorrect, the choice is now between the two other options. In other words, the student has a 50 percent chance of getting the item correct (one out of two). Blind

guessing, on the other hand, gives a student a 25 percent chance (one out of four) of making the correct choice if there are four options. Clearly, 50 percent (as in the example of informed guessing) is better than 25 percent (as in the example of blind guessing). Twenty-five percent is, however, better than zero percent, which is the chance of getting the question correct if it is not answered. Remember, however, that knowing the material is the best way to get a good test score.

Summary

Time Management, Careful Reading, and Appropriate Guessing are three general principles of test-taking which test wise students understand and use. Thus, test wise students

° figure out a working pace which will help them finish the test on time without giving up any accuracy;

° make sure that they completely understand the test directions before starting the test and then use this same type of careful reading to answer each test question;

° think of the correct answer to a question before reading any of the options to give them a little edge in selecting the correct answer;

° try to clear up any problems that they have about the test by (1) asking the instructor or teacher for help and/or (2) putting a check mark next to confusing questions and returning to them after the rest of the questions have been answered; and

° know that informed guessing may sometimes be the only reasonable solution to a difficult or confusing question.

143

Specific Methods for Appropriate Guessing

As we stated earlier, test wiseness is no substitute for knowledge.
Even when clues to the correct answer are given, knowledge of the subject
matter is usually necessary in order to really use those clues. In other
words, test wiseness is not and cannot be split away from subject matter
knowledge. Since we know, however, that most students have to guess at
answers to some test questions, let's talk about some specific methods for
informed guessing.

The four specific methods we will show you are based on the fact that
being able to reason logically is very important to test taking success.
Reasoning, like test-taking, is a skill which can be developed and improved.
The following paragraphs will help you become skilled in using four specific
logical reasoning strategies.

1. Unreasonable Options (Options that don't make sense)

When we talked about the use of guessing, we pointed out how important
it is to be able to ignore or eliminate options which are clearly incorrect.
In other words, we were talking about the use of the "process of elimination."
Test wise students may not know the answer to a question, but by eliminating
options which they know are incorrect, they can narrow their choice down to
only one or two options. As was mentioned earlier, each option that can be
eliminated increases the chances of choosing the correct answer.

Thus, the unreasonable option method tells students to judge each option
in terms of whether or not it makes sense. For example,

<u>Example</u>: The 2 parts of a test question are:

    a. the beginning and the end.
    b. the question and the statement.
    c. the middle and the basic.
    d. the stem and the options.

<div align="center">Correct answer: "d"</div>

In this question, it is fairly logical to assume that options <u>a</u> and <u>c</u> are unreasonable--they don't make sense. Thus, by eliminating these two options, only options <u>b</u> and <u>d</u> are left. The chances of getting the correct answer have now been raised to 50 percent (one out of two).

> <u>NOTE</u>: <u>IF writing in the test booklet is allowed</u>, we have found that it is often very helpful for students to draw a line through options which they consider unreasonable.

It is then easier to judge the other options. If writing in the test booklet is <u>not</u> allowed, then we suggest that students eliminate unreasonable options in their mind and then judge the options that are left.

2. <u>Similar and Conflicting Options</u>

Sometimes a multiple choice question will have two or more options which mean the same or nearly the same thing. Logically, if two options have the same or nearly the same meaning, it is impossible for one of them to be correct and the other incorrect. Either <u>both</u> are correct or <u>neither</u> is correct. This is the thinking behind the <u>similar options</u> strategy. In other words, all similar options must be treated the same. It also follows that if two options are similar, the answer which means <u>all</u> or <u>none</u> should be the choice most likely to be correct. Look at the following examples to help you see what we mean.

Example: If you are uncertain of the answer to a test question,
it is best to _____.

 a. leave the question blank
 b. make a guess
 c. choose option c
 d. don't answer the question

Correct answer: "b"

Options a and d are nearly the same. You cannot choose both of them,

so you have to choose neither of them. The correct answer has to be either

b or c.

Example: On test questions with 4 options, the chances of getting
the correct answer by blind guessing is _____.

 a. 20 percent
 b. one fifth
 c. 25 percent
 d. one out of five

Correct answer: "c"

Since you can only choose one option and options a, b, and d all say

the same thing, the correct answer has to be c.

In a similar way, there may be questions which have two or more

options that conflict. That is, a question may have one option that means

exactly the opposite of what another option means. When this is the case,

it is obvious that both options cannot be correct. Hence, the correct

answer has to be one of them or neither of them--but not both of them. The

following example should illustrate this point.

Example: Informed guessing is really _____.

    a. an easy thing to do
    b. a process of elimination
    c. a difficult thing to do
    d. all of the above are correct

Correct answer: "b"

Options a and c are conflicting statements. (Option a means exactly the opposite of option c.) Informed guessing cannot be an easy thing to do and a difficult thing to do at the same time. The correct answer has to be one of them or neither of them, but not both of them. Options d therefore has to be wrong because choosing it would make both a and c correct. You now have to choose between 3 options: a, b, or c.

3. Stem-Option Similarity

Sometimes the stem of a question and one of the options have some things in common. That is, the same important word may appear in both the stem and one of the options or part of a word may be repeated in both places. Another example of a stem-option similarity would be if two important words with about the same meaning were found in both places. The following examples can help you understand stem-option similarity.

Example: The section of the Test Wiseness lesson which discusses the importance of properly managing test time limits is called _____.

    a. General test taking skills
    b. Careful reading
    c. Appropriate guessing
    d. Time Management

Correct answer: "d"

Direct repetition of key words is an obvious clue to the correct answer in this question. That is, "managing test time limits" (in the stem) is nearly the same as the correct answer, "Time Management."

Example: Nervousness which is caused by the thought of having to take an examination is called _____.

a. Neurotic compulsive
b. Depressive fixation
c. Test anxiety
d. Neurotic fear

Correct answer: "c"

In this example, words that mean nearly the same thing are the clues to the correct answer. That is, "examination" and "test" mean about the same thing and "nervousness" and "anxiety" mean about the same thing. Thus, the correct answer is c, Test Anxiety.

4. Information From Other Options

Most tests are designed to measure what a student knows about a specific subject area. All of the test questions make up what the test writer considers to be the important parts of that subject. It is, therefore, possible to use information in one question to help you answer another question. Take the following examples.

Example: The stem of a question is _____.

a. the part of the question which introduces the options
b. the part that lists the answers the students can choose from
c. at the end of a question
d. the main part of the question

Correct answer: "a"

followed by an item like:

> The option portion of a question is _____.
>
> a. the part of the question which introduces the options
> b. the part that lists the answers the student can choose from
> c. at the end of a question
> d. the main part of the question

<p align="center">Correct answer: "b"</p>

It is clear that these questions are pointing out the two major parts of a test question and that the options for the two questions are the same. It is also clear that the answer to the first question has to be different from the answer to the second question. If you could only be certain of the answer to the first question, you could at least eliminate that answer from your choices in the second question. Thus, if you were fairly sure that the answer to the first question was a, you could eliminate option a from the list of possible choices in the second question.

Information from other options is not always this easy. Furthermore, the success of this method depends upon the amount of "information" contained in the exam. Each test will probably be different. Finally, this method is most helpful for students who know the subject matter well but are having a problem remembering it. As a more complex example of this strategy, look at the questions below.

Example: When a test question has two options which conflict with each other, _____.

    a. either both are correct or both are incorrect
    b. neither of the contradictory options is correct
    c. one or neither but not both options are correct
    d. both options are correct

Correct answer: "c"

When a test question has two options which are similar or reinforce each other, then

    a. only one option is correct.
    b. either both or neither is correct.
    c. both options are incorrect.
    d. both options are correct.

Correct answer: "b"

It is very possible that these questions would not be placed close together and, therefore, the student would have to know that both of these questions deal with the "similar and conflicting options" method of test taking. Furthermore, since "conflict" (as in the first question) and "similar" (as in the second question) are about opposite in meaning, the answers to the questions would have to be about opposite in meaning. Thus, the answer to the first question ("one or neither but not both options are correct") is about the opposite in meaning to the answer to the second question ("either both or neither is correct").

This completes the section on logical reasoning methods. Let's now look at some word or phrase methods.

Word or Phrase Methods

In addition to logical reasoning methods, test wise students often use (1) specific details, (2) key words and/or (3) sentence structure clues

150

to help them figure out the correct answer. Experienced test makers usually try to avoid errors like these but sometimes, certain clues are "built-into" the test.

1. Specific Details

Once again, the main point for the student to remember is to <u>read everything carefully</u>. Usually every word has a specific purpose and this means that noticing <u>specific details</u> in either the stem or the options is very important. That is, a specific group of words or statement can really change the meaning of a question. The following questions are examples of how <u>specific detail</u> can help you select the correct answer.

<u>Example</u>: After answering each test question, it is a good idea to _____.

    a. hurry on to the next question
    b. put a check mark in the margin
    c. reread the question
    d. take the time to check and make sure you have marked the answer you intended to mark.

Correct answer: "d"

The correct answer in this question, option <u>d</u>, is much more detailed and much more specific than the other answers. It is also longer in length. <u>Often, the longer or more specific option will be the correct answer</u>. This, of course, is not always true but it is something to which you should pay close attention.

<u>Example</u>: The Unreasonable Option Method, which states that options can be eliminated on the basis that they are not reasonable or not related to the stem, _____.

    a. is a type of logical reasoning method
    b. is a type of general test-taking method
    c. is a type of option elimination method
    d. is a type of test question.

Correct answer: "a"

This question could have been stated "The Unreasonable Option Method is _____." Instead, the test writer chose to add a group of words which define what the Unreasonable Option Method is. This specific detail should give the test wise student a clue to the correct answer. That is, the student doesn't need to know the definition of the Unreasonable Option Method to answer this question. The test writer has given the student the definition. The student can use the writer's definition to decide what type of method this is. Thus, the Unreasonable Option Method is a type of logical reasoning method. The correct answer is "logical reasoning method."

2. Key Words

    Key words are words such as:

all	must	except	sometimes
always	never	may	seldom
every	none	often	perhaps
necessary		only	generally

    These words have specific meanings and therefore, give specific information about the stem or an option or both. Thus, it is very important that these words be treated with great care. For example, the words all and none should be taken literally. They mean 100 percent or 0 percent of the time, with no exceptions. In our world, very few things are that easy. Most principles have exceptions. Thus, these words may not always signal an incorrect option but they should tell you to read very carefully. It is often very helpful to underline (if writing in the test booklet is allowed) all key words while you are reading to make sure that you do not misread or overlook them. If writing in the test booklet is not allowed, be sure to stop and make a mental note whenever you come to a key word. Look at the following example.

Example: All of the following statements concerning test-wiseness are true except:

    a. only students with high innate abilities have this.
    b. it is not a substitute for knowledge.
    c. it can be learned, taught, and improved.
    d. it can help reduce test anxiety.

Correct answer: "a"

The three key words in this question are: all and except in the stem and only in the first option. The key words in the stem tell you that the correct answer is the only statement which is not true. In option "a", the word only should tell you to read that item carefully--it is very suspect and in this case not true and, therefore, the correct answer.

3. Sentence Structure Clues

Sometimes the correct answer becomes clear due to the fact that the words in the stem don't make a good sentence when read with the words in one of the options. That is, if the verb in the stem is past tense and only one of the four options contains a past tense verb, you can be fairly sure that it is this option which is correct. Another example of sentence structure clues would be if the verb in the stem is plural and only two of the four options contained plural verbs. Thus, the correct answer would have to be one of the options containing a plural verb.

Let's look a little more carefully at this method. In multiple-choice items, the correct answer should agree with the stem. If an option does not make a good sentence when read with its stem, it probably should be eliminated as an incorrect option.

You say you're not very good at English? Well, does it sound right? When you read the stem and then one of the options, does it make sense? Try this idea with the following example.

153

<u>Example</u>: As a general rule, options containing specific words
(e.g., always, only, never, all) _____

    a. are probably correct
    b. is a cue to elimination
    c. are probably <u>not</u> correct
    d. were the test wiseness strategy

<div align="center">Correct answer: "c"</div>

Due to the fact that options <u>b</u> and <u>d</u> do not make a good sentence when
added to the end of the stem, the test wise student knows that these options
are incorrect. That is, try saying "As a general rule, options containing
specific words is a cue to elimination." That doesn't sound good, so it must
be wrong. The same argument can be made for eliminating option <u>d</u>. Thus,
the only possible options are <u>a</u> and <u>c</u>.

Of course, it is not very likely that you will run into many questions
which are this poorly written. Most test-makers are more careful than that.
It is, however, something which you should be aware of and be able to use
if and when the chance comes about.

This completes the section on <u>Word or Phrase Methods</u>. <u>Additional</u>
<u>Hints</u>, a <u>Summary</u> and a <u>Self Test</u> follow.

<u>Additional Hints</u>

1. Make sure you haven't recorded more than one answer for any
question.

2. Don't worry about several questions in a row having the same letter
response. This sometimes happens. Answer each question on the basis of
that question, not by the pattern of responses you get on your answer sheet.

3. Check the number of each question as you come to it, and make sure you record the answer at the same number on your answer sheet. Sometimes the pages of the test booklet stick together and you turn more than one page at a time.

4. Don't erase--unless you are _sure_ your first selection was wrong. Trust your subconscious. Although you may not be able to understand the reason for selecting a particular response, that small voice in your mind that makes you select a certain answer is more often right than wrong. If you do change an answer, have a good reason for doing so. Do not second guess yourself.

5. Compare only two options at a time. It is easier to choose the better of two options than to try to keep all options in your mind. If "a" looks better than "b", eliminate "b" and compare "a" with "c", etc.

6. Before turning in your completed test make sure you have answered _all_ questions. Some students are in so much of a hurry that they forget to answer the last page of questions in the test booklet.

7. It is very important that you have a good test taking mood when you enter the testing room. This means that you should be _relaxed yet alert_. If you find this hard to do, try doing the Slow Deep Breathing exercises that are given on the next page. They were written to show you how to control your feelings of being uptight and scared when you get ready to take a test. A lot of students have found that slowing down their breathing like this slows down their heart rate and this reduces their feeling of being uptight.

SLOW DEEP BREATHING

1. Take your attention completely away from studying for 20 to 30
   seconds. A few seconds won't cost you anything, and it may gain
   you much.

2. Settle back or slump into a position in the chair that is as comfortable
   and relaxed as possible. Close your eyes.

3. Relax all the muscles of your body. Don't do a halfway job, relax
   entirely and all over. Don't <u>try</u> to relax so much as just <u>let go</u>
   of all muscles and tension; let them go loose and heavy. Some people
   help this along by first tensing all their muscles in that comfortable
   sitting position, holding the tension for about five seconds (throughout
   the body) and then letting go and relaxing all muscles entirely.

4. *Having let go and relaxed, take in a very deep breath and hold it for
   a few seconds, then very slowly let it out. Repeat this once or twice,
   keeping your eyes closed.

5. You can deepen the relaxation and help relax away feelings of tension
   by thinking silently to yourself the words "calm" and "relax" as you
   slowly let out your breath. Think or picture these words to yourself
   as you slowly let out the breath.

* Step (4), taking slow deep breaths, is the most important step. The
  other steps have to do with setting the stage and practice.

Not only will a good mood help you feel confident, comfortable and

ready-to-go, but it will also help you to "recover" information which might

have gotten "lost." That is, if you feel that the answer to a question is

"just on the tip of your tongue" but it doesn't seem to come out, try the

Slow Deep Breathing exercises. This will help the information to "float up."

If you are up-tight, you will likely block this process. If you are relaxed

yet alert, you can use all the knowledge you have to get a good test score.

A Word About Text Anxiety

It is one thing to say that test taking skills can reduce test anxiety and another thing all together to really be able to do this. It is no easy task to train yourself not to be anxious when taking a test. It is possible, however, to do this. One thing that should be remembered is that anxiety should be at a level that is high enough to motivate you but not high enough to scare you.

We have found that people who become very anxious during tests can learn to lower their anxiety by changing the way they talk to themselves. That is, a student might feel very uptight by the thought of having to answer 100 multiple-choice questions in an hour. Taking each question one at a time, however, almost makes certain that the anxiety will be reduced. This does not mean that each question should be treated as if the entire testing time could be given to answering it, but each question should be taken as a single item.

Another way to deal with test anxiety is to talk yourself out of it. That is, sometimes when you are feeling scared and nervous about a test, you can use some simple logic to judge how reasonable the fear really is. When you are feeling anxious about a test, ask yourself some questions like: "Considering how much I have prepared for this test, should I be scared?" or "Considering how I did on the short quizzes, is there any reason to believe that I don't know the information?"

Talking to yourself in a rational and reasonable manner is sometimes very difficult to do. If you think that you need more practice in this area, ask your instructor to give you the lesson on Concentration Management.

Another key to reducing anxiety is to be well prepared. This means that knowledge of the subject and of test taking skills is very important to helping you feel confident and self assured.

Summary

This lesson has covered seven test-taking methods:

Logical Reasoning Method

1. Unreasonable Options
2. Similar-conflicting options
3. Stem-option similarities
4. Information from other options

Word or Phrase Method

5. Specific details
6. Key words
7. Sentence structure clues

These test-taking methods are aids to improving poor test-taking skills. They are not universal laws and should not be used without subject matter knowledge.

SELF TEST

DIRECTIONS: Each of the questions below is followed by four
alternative options. Select the one that is
best in each case and circle the corresponding
letter. The answers and the strategy used by a
test wise student who was uncertain of the correct
answer are found on page 32.

1. Setting up _____ is one of the first things a test wise student
should do.

   a. a pattern of correct and incorrect answers
   b. a method for determining the code of the test
   c. a reward system to be given at the end of the test
   d. a schedule of progress for completing the test

2. Test directions and instructions should be _____.

   a. skimmed quickly
   b. ignored
   c. read very carefully
   d. read briefly and quickly

3. If you are uncertain of an answer, it is best to _____.

   a. skip the item completely
   b. guess, especially if there is no penalty for guessing
   c. choose option c
   d. choose "none of the above" option

4. After reading the stem of a question, a test wise student should _____.

   a. glance over the options until the one that seems correct
      is found
   b. think of what the correct answer probably is and then
      read each option carefully
   c. decide which test-taking strategy should be used
   d. guess

5. After answering each question, the test wise student should _____.

   a. take time to make sure the answer marked is the answer
      that was selected as the correct option
   b. hurry on to the next question
   c. decide which test-taking strategy could have been used
   d. keep looking at the clock to check on progress

6. Often options which include other options, such as "Both A and C" or "All of the above" are _____.

   a. unimportant and should be ignored
   b. designed to "trick" the student
   c. never correct
   d. correct

7. When a test question has two options which contradict each other (have the opposite meaning),

   a. both options are correct.
   b. "none of the above" is the correct option.
   c. one or neither but not both options are correct.
   d. neither of the contradictory options is correct.

8. When the test question has two options which complement each other (have the same meaning), then

   a. either both or neither is correct.
   b. one or neither but not both options are correct.
   c. "All of the above" is the correct option.
   d. neither option is correct.

9. If you have only a little bit of information about a specific question, you should _____.

   a. guess blindly rather than spending time trying to figure out the correct option
   b. skip the question and come back to it later
   c. choose option c
   d. make an "informed guess" after eliminating as many options as possible

10. On a five-choice test question, the probability of getting the correct answer by blind guessing is

    a. 1%
    b. 5%
    c. 20%
    d. 25%

11. As a general rule, options containing key words such as always, only, never and all are

    a. designed to "trick" the student.
    b. not correct.
    c. correct.
    d. unimportant.

12. When you are uncertain of the answer to an item, it is sometimes possible to eliminate options on the basis that

    a. they don't fit the answer pattern.
    b. they don't fit the answer code.
    c. they are too specific.
    d. they are unreasonable, absurd or unrelated to the stem.

13. Stem-option similarity is a test-taking method which states that the correct option often contains

    a. more words or details than the other options.
    b. information from other questions.
    c. important words which were also used in the stem.
    d. similar definitions.

14. Test wiseness is most effective when combined with _____.

    a. subject knowledge
    b. test taking skills
    c. nothing else; should be used alone
    d. a college education

15. In some cases, information given in one question

    a. is related to the proceeding question.
    b. may be helpful in answering another question.
    c. is always unrelated to the rest of the test.
    d. is always related to the very next question.

16. If time remains after you have finished a test, you should _____.

    a. turn in the test immediately
    b. see if there is an answer pattern
    c. review those questions which you checked as being difficult
    d. start the test over again

17. Sentence structure clues

    a. can only be used effectively by people who are experts in English.
    b. should be ignored.
    c. are usually unimportant.
    d. are important cues which can lead to the correct answer.

18. The more anxious you are while taking a test,

    a. the better your chances of obtaining a high score.
    b. there is no effect on test score.
    c. the more likely you are to finish the test on time.
    d. the more likely you are to get "hung up" and do pporly on the
        test.

19. Your mood when you are taking a test should be

    a. very passive and calm.
    b. tense and alert.
    c. relaxed yet alert.
    d. mood is not important in test taking.

20. When should you change an answer?

    a. Whenever you begin to second guess yourself
    b. Only when you are unsure of your first choice
    c. Whenever you think your intuition may have been wrong
    d. Only when you are sure your first choice was wrong

ANSWERS AND STRATEGIES

1. Correct answer: "d"

   STRATEGY: (1) Options a and b are similar in meaning and therefore, either both are correct or neither is correct. Since there is no option which allows you to choose both a and b, both of these options have to be incorrect. That means you are left with options c and d.

   (2) You can eliminate option c because it is an unreasonable option. Thus, the only possible option is d.

2. Correct answer: "c"

   STRATEGY: (1) Option b is unreasonable and therefore can be eliminated.

   (2) Options a and d are similar in meaning and therefore, either both are correct or neither is correct. Since there is no option which allows you to choose both a and d, both of these options have to be incorrect. Thus, the only possible option is c.

3. Correct answer: "b"

   STRATEGY: (1) Some people would say that the correct answer has to be b because the other three options are unreasonable.

   (2) Another clue is that the correct option is much longer in length and more specific in detail than the other options.

4. Correct answer: "b"

   STRATEGY: (1) You can eliminate option d due to the fact that it is much shorter than the other options and is really unreasonable.

   (2) Option c can be eliminated due to the fact that it too is unreasonable.

   (3) With just two options (a and b) left, the correct answer is probably the one which talks about reading carefully as this idea is also used in Question #2.

ANSWERS AND STRATEGIES (Continued)

5. Correct answer: "a"

   STRATEGY: (1) Due to the fact that option a is much more specific
       than the other options, it is probably the correct option.

       (2) Option c can be eliminated because it doesn't make
   sense when read with the stem.

       (3) Option b is probably incorrect due to the fact that two
   previous questions (#2 and #4) have stressed taking the time to
   read things carefully.

6. Correct answer: "d"

   STRATEGY: (1) Both options a and b are unreasonable so you only have
       to choose between options c and d. Note that in this case the
       shortest option is the correct answer.

7. Correct answer: "c"

   STRATEGY: (1) Both options a and b can be eliminated due to the fact
       that they are unreasonable. You now have to choose between options
       c and d.

       (2) Since option c is more specific, it is probably the
   correct answer.

8. Correct answer: "a"

   STRATEGY: (1) Since the word "complement" in this question and the word
       "contradict" in the previous question are opposites, it is logical
       to assume that the answers to the two questions also have to be
       opposites.

       (2) Option b in this question is the same as the correct
   answer in the previous question so it can be eliminated.

       (3) Option d is very similar to option b so it too can be
   eliminated.

       (4) Thus, options a and c remain. Option c is unreasonable
   so the correct answer has to be a.

164

9. Correct answer: "d"

   STRATEGY: (1) Option c is unreasonable, and therefore, can be
   eliminated.

   (2) Options a and d are both more specific than option b
   so b can be eliminated.

   (3) Options a and d have opposite meanings so one or
   neither but not both are correct.

   (4) Option a is probably unreasonable due to the previous
   questions which have stressed taking your time and reading
   things carefully. Thus, option d is the correct answer.

10. Correct answer: "c"

    STRATEGY: (1) On a five-choice test question, you have one choice (the
    one you select) out of five (five possible choices) of getting the
    correct answer by blind guessing. "One out of five" can also be
    stated as 1/5. One-fifth is another way of saying 20% (5 X 20 = 100).
    The correct answer has to be option c.

11. Correct answer: "b"

    STRATEGY: (1) Options a and d are unreasonable and can therefore be
    eliminated. You have to choose between options b and c.

12. Correct answer: "d"

    STRATEGY: (1) Options a and b are unreasonable and therefore, can
    be eliminated.

    (2) Option d is the most specific and detailed option and it
    is, therefore, probably the correct answer.

13. Correct answer: "c"

    STRATEGY: (1) Option d is unreasonable and therefore, can be eliminated.

    (2) Options a, b and c are all possible answers but option
    c is the longest and most specific answer so it is probably correct.

ANSWERS AND STRATEGIES (Continued)

14. Correct answer: "a"

   STRATEGY: (1) Option b (test taking skills) is the same thing as test
      wiseness (used in the stem) so this option is unreasonable and
      can be eliminated.

      (2) Option c is probably incorrect due to the fact that it
   doesn't make sense when added to the stem.

      (3) You have to choose between options a and d.

15. Correct answer: "b"

   STRATEGY: (1) Options c and d can be eliminated due to the use of
      key words (always).

   (2) Option a can be eliminated due to the fact that it is very
   similar to option d which was just eliminated. Thus, option b
   has to be the correct answer.

16. Correct answer: "c"

   STRATEGY: (1) Option b is unreasonable and therefore, can be
      eliminated.

      (2) Options a and d have opposite meanings and therefore,
   either one or neither of them is correct.

      (3) Option c is the most detailed and specific and is
   therefore, most likely to be the correct option.

17. Correct answer: "d"

   STRATEGY: (1) Option a can be eliminated due to the use of a key word
      (only).

      (2) Options b and c are similar and both are unreasonable
   so both can be eliminated. The only possible answer is option d.

18. Correct answer: "d"

   STRATEGY: (1) Option b can be eliminated due to the fact that it
      doesn't make sense when added to the end of the stem.

      (2) Although options a, c and d could all be correct, option
   d is the most specific and detailed and is probably the correct
   answer.

ANSWERS AND STRATEGIES (Continued)

19. Correct answer: "c"

   STRATEGY: (1) Option d can be eliminated due to the fact that it
      doesn't make sense when added to the end of the stem.

          (2) You now have to choose between options a, b or c.

20. Correct answer: "d"

   STRATEGY: (1) Options a and c are very similar. That means both of
      them have to be correct or both of them have to be incorrect.
      Since there is no way for you to choose both options as correct,
      both of them have to be incorrect.

          (2) Choosing between options b and d, the specific detail
      of underlining the word "sure" in option d seems to indicate that
      this is probably the correct answer.

APPENDIX E

ORIGINAL STUDY SKILLS QUESTIONNAIRE

DIRECTIONS: A number of statements which students have used to describe
their study habits and skills are given below. Please read each statement
carefully and then blacken the space on your answer sheet which best describes
your study habits and skills. There are no right or wrong answers. Do not
spend too much time on any one statement, but select the answer which best
describes your study habits and skills. Notice that you are asked to describe
your study skills in four basic areas (reading, memorization, test-taking,
concentration management), so be sure to evaluate these areas separately.

I.   Reading Comprehension Skills

     1. through 15.

II. Memorization Skills

     16. through 27.

III. Test-Taking Skills

     28. through 38.

IV. Concentration Management Skills

     39. through 50.

I. Reading Comprehension Skills

1. When studying, one of the first things I do is try to arrange things in some logical order, such as by dates, class, from least to most, etc.

   a. almost always
   b. most of the time
   c. some of the time
   d. almost never

2. In taking notes, I use an outline method.

   a. almost always
   b. most of the time
   c. some of the time
   d. almost never

3. I quickly read a whole section of what I am going to study to get a general idea of what it's about before I read it in detail.

   a. almost always
   b. most of the time
   c. some of the time
   d. almost never

4. I get deeply involved with material I am studying (i.e., I really think about it rather than just trying to memorize it.)

   a. almost always
   b. most of the time
   c. some of the time
   d. almost never

5. If I am reading some course material and cannot understand it, I keep going anyway in order to finish the assignment.

   a. very frequently
   b. frequently
   c. sometimes
   d. almost never

6. I would rate my ability to read and remember technical information as:

   a. well above average
   b. above average
   c. below average
   d. well below average

7. I would rate my ability to take good text notes:

   a. well above average
   b. above average
   c. below average
   d. well below average

8. When reading I consciously try to relate the material
   to other things that I know.

   a. almost always
   b. most of the time
   c. some of the time
   d. almost never

9. When the material is difficult, I usually

   a. skip over it hoping I'll understand it later
   b. stop studying because if I can't get it it's a
      waste of time
   c. don't worry about it, it's probably not important
      anyway
   d. work to figure it out by myself or ask for help

10. You are reading a lesson and find that the material actually
    relates to something that you are interested in. *How often
    does this happen?*

    a. very frequently
    b. frequently
    c. sometimes
    d. almost never

11. In comparison to the amount of time spent reading *your* notes
    and the textbooks, how much time do you spend testing yourself
    on the material when studying for an exam?

    a. a large amount of time
    b. a moderate amount of time
    c. a small amount of time
    d. generally not at all

12. Do you take notes when reading technical information?

    a. almost always
    b. most of the time
    c. some of the time
    d. almost never

13. Do you try to figure something out when you can't understand it?

    a. almost always
    b. most of the time
    c. some of the time
    d. almost never

14. You finish reading a lesson and find that you don't remember what you read. How often does this happen to you?

    a. very frequently
    b. frequently
    c. sometimes
    d. almost never

15. I think it is easy to find the main idea of a paragraph or passage.

    a. almost always
    b. most of the time
    c. some of the time
    d. almost never

II. Memorization Skills

16. Do you ever make memorizing information into a game?

    a. very frequently
    b. frequently
    c. sometimes
    d. almost never

17. Do you try to find personal relevance in the technical material to help you remember it?

    a. almost always
    b. most of the time
    c. some of the time
    d. almost never

18. I enjoy memorizing lists.

    a. almost always
    b. most of the time
    c. sometimes
    d. almost never

19. How important do you think memorization is to the learning process?

    a. very important
    b. important
    c. somewhat important
    d. not important

20. My memory for facts is:

    a. well above average
    b. above average
    c. average
    d. below average

21. When I go about memorizing something _____.

    a. I just repeat the information over to myself
    b. I try to look for it to relate to something I already know
    c. I write it down several times to "cement" it into my mind
    d. I don't have a specific method for memorizing information

22. I find myself memorizing rules, definitions, formulas, etc. without understanding them.

    a. almost always
    b. most of the time
    c. some of the time
    d. almost never

23. You have read some material for a lesson, and you feel that you understood pretty much what was being said. A classmate then asks you a question on the material or you try to recall some of the material yourself and find that you can't remember much of what you have read. How often does this happen to you?

    a. very frequently
    b. frequently
    c. sometimes
    d. almost never

24. When it's necessary for you to memorize material how much time do you spend memorizing it?

    a. more than 1/2 my study time
    b. 1/2 my study time
    c. 1/4 to 1/2 of my study time
    d. I don't memorize material

25. To memorize something I repeat it to myself many times.

a. very frequently
b. frequently
c. sometimes
d. almost never

26. To memorize something I write it down several times.

a. very frequently
b. frequently
c. sometimes
d. almost never

27. How would you rate your ability to memorize and remember information?

a. well above average
b. above average
c. below average
d. far below average

III. Test Taking Skills

28. I would rate my ability to do well on multiple choice tests as _____.

a. well above average
b. above average
c. below average
d. well below average

29. I usually read the test directions very carefully.

a. very frequently
b. frequently
c. sometimes
d. almost never

30. If you guess at an answer to a five-choice question, what do you think your chances are of getting the correct answer?

a. 0%
b. 5%
c. 20%
d. 25%

31. If time remains after you have completed a test, what do you usually do?

    a. turn in the test immediately
    b. see if there is an answer pattern
    c. review those questions which I checked as being difficult
    d. start the test over again

32. When I come to a question whose answer I am unsure of I usually _____.

    a. try to figure out the answer
    b. make a blind guess
    c. skip the question

33. I usually run out of time when I'm taking a test.

    a. very frequently
    b. frequently
    c. sometimes
    d. almost never

34. You are taking a test and you come to a question for which you are sure you know the answer, but you just can't quite remember it. How often does this happen?

    a. very frequently
    b. frequently
    c. sometimes
    d. almost never

35. When taking an exam I am usually feeling _____.

    a. very nervous and uptight
    b. somewhat nervous and uptight
    c. relatively relaxed
    d. very relaxed

36. You study very hard and know that you understand the material but when you sit down to take the test you forget everything you knew. How often does this happen to you?

    a. very frequently
    b. frequently
    c. sometimes
    d. almost never

37. I often take too much time on the first few questions of a test and then have to rush through the rest of the questions in order to finish on time.

    a. very frequently
    b. frequently
    c. sometimes
    d. almost never

38. When answering test questions, I choose the first option that looks correct.

    a. very frequently
    b. frequently
    c. sometimes
    d. almost never

IV. Concentration Management Skills

39. I would rate my ability to concentrate (compared to other students) as:

    a. well above average
    b. above average
    c. below average
    d. far below average

40. I would rate my ability to deal with distractions that occur while I'm studying as:

    a. well above average
    b. above average
    c. below average
    d. far below average

41. I would rate my ability to keep my feelings and emotions from interfering with my school work as:

    a. well above average
    b. above average
    c. below average
    d. far below average

42. I would rate my ability to deal with distractions that occur while I'm taking a test as:

    a. well above average
    b. above average
    c. below average
    d. far below average

43. I have a hard time getting myself to start studying.

    a. almost always
    b. most of the time
    c. some of the time
    d. almost never

44. Once I get started I find it easy to continue studying for a relatively long time.

    a. almost always
    b. most of the time
    c. some of the time
    d. almost never

45. I enjoy studying. I am usually in a good mood when I am studying.

    a. almost always
    b. most of the time
    c. some of the time
    d. almost never

46. I have a lot of trouble concentrating (that is, I can only study for a very short time before I start daydreaming, etc.)

    a. almost always
    b. most of the time
    c. some of the time
    d. almost never

47. You are studying a lesson. After reading a number of paragraphs you suddenly realize you have no idea what you just read because you have been thinking of other things. How often does this happen to you?

    a. very frequently
    b. frequently
    c. sometimes
    d. almost never

48. I get drowsy when I start to study.

    a. very frequently
    b. frequently
    c. sometimes
    d. almost never

49. How often do you say to yourself, "If I weren't under such time pressure my attitude toward studying would be better."?

    a. very frequently
    b. frequently
    c. sometimes
    d. almost never

50. If other students are studying near me, I have trouble blocking out noise in the room.

    a. very frequently
    b. frequently
    c. sometimes
    d. almost never

APPENDIX F

REVISED STUDY SKILLS QUESTIONNAIRE

DIRECTIONS: A number of statements which students have used to describe
their study habits and skills are given below. Please read each statement
carefully and then blacken the space on your answer sheet which best describes
your study habits and skills. There are no right or wrong answers. Do not
spend too much time on any one statement, but select the answer which best
describes your study habits and skills. Notice that you are asked to describe
your study skills in four basic areas (reading, memorization, test-taking,
concentration management).

I. Reading Comprehension Skills

1. I get deeply involved with material I am studying (i.e., I
   really think about it rather than just trying to memorize it).

   a. almost always
   b. most of the time
   c. some of the time
   d. almost never

2. If I am reading some course material and cannot understand it,
   I keep going anyway in order to finish the assignment.

   a. very frequently
   b. frequently
   c. sometimes
   d. almost never

3. I would rate my ability to read and remember technical information
   as:

   a. well above average
   b. above average
   c. below average
   d. well below average

4. I would rate my ability to take good text notes:

   a. well above average
   b. above average
   c. below average
   d. well below average

5. In comparison to the amount of time spent reading your notes and the textbooks, how much time do you spend testing yourself on the material when studying for an exam?

    a. a large amount of time
    b. a moderate amount of time
    c. a small amount of time
    d. generally not at all

6. Do you try to figure something out when you can't understand it?

    a. almost always
    b. most of the time
    c. some of the time
    d. almost never

7. You finish reading a lesson and find that you don't remember what you read. How often does this happen to you?

    a. very frequently
    b. frequently
    c. sometimes
    d. almost never

8. I think it is easy to find the main idea of a paragraph or passage.

    a. almost always
    b. most of the time
    c. some of the time
    d. almost never

II. Memorization Skills

9. Do you try to find personal meaning in the technical material to help you remember it?

    a. almost always
    b. most of the time
    c. some of the time
    d. almost never

10. My memory for facts is:

    a. well above average
    b. above average
    c. average
    d. below average

11. You have read some material for a lesson, and you feel that you understood pretty much what was being said. A classmate then asks you a question on the material or you try to recall some of the material yourself and find that you can't remember much of what you have read. How often does this happen to you?

    a. very frequently
    b. frequently
    c. sometimes
    d. almost never

12. When it's necessary for you to memorize material, how much time do you spend memorizing it?

    a. more than 1/2 my study time
    b. 1/2 my study time
    c. 1/4 to 1/2 of my study time
    d. I don't memorize material

13. To memorize something, I repeat it to myself many times.

    a. very frequently
    b. frequently
    c. sometimes
    d. almost never

14. To memorize something, I write it down several times.

    a. very frequently
    b. frequently
    c. sometimes
    d. almost never

15. How would you rate your ability to memorize and remember information?

    a. well above average
    b. above average
    c. below average
    d. far below average

III. Test Taking Skills

16. I would rate my ability to do well on multiple choice tests as:

    a. well above average
    b. above average
    c. below average
    d. well below average

17. I usually read the test directions very carefully.

    a. very frequently
    b. frequently
    c. sometimes
    d. almost never

18. I would rate my ability to finish tests on time as:

    a. well below average
    b. below average
    c. above average
    d. well above average

19. You are taking a test and you come to a question for which you are sure you know the answer, but you just can't quite remember it. How often does this happen?

    a. very frequently
    b. frequently
    c. sometimes
    d. almost never

20. When taking an exam, I am usually feeling _____.

    a. very nervous and uptight
    b. somewhat nervous and uptight
    c. relatively relaxed
    d. very relaxed

21. You study very hard and know that you understand the material but when you sit down to take the test you forget everything you knew. How often does this happen to you?

    a. very frequently
    b. frequently
    c. sometimes
    d. almost never

IV. Concentration Management Skills

22. I would rate my ability to concentrate (compared to other students) as:

    a. well above average
    b. above average
    c. below average
    d. far below average

23. I would rate my ability to deal with distractions that occur while I'm studying as:

    a. well above average
    b. above average
    c. below average
    d. far below average

24. I would rate my ability to keep my feelings and emotions from interfering with my school work as:

    a. well above average
    b. above average
    c. below average
    d. far below average

25. I would rate my ability to deal with distractions that occur while I'm taking a test as:

    a. well above average
    b. above average
    c. below average
    d. far below average

26. Once I get started, I find it easy to continue studying for a relatively long time.

    a. almost always
    b. most of the time
    c. some of the time
    d. almost never

27. I enjoy studying. I am usually in a good mood when I am studying.

    a. almost always
    b. most of the time
    c. some of the time
    d. almost never

28. You are studying a lesson. After reading a number of paragraphs you suddenly realize you have no idea what you just read because you have been thinking of other things. How often does this happen to you?

    a. very frequently
    b. frequently
    c. sometimes
    d. almost never

29. I get sleepy when I start to study.

    a. very frequently
    b. frequently
    c. sometimes
    d. almost never

30. If other students are studying near me, I have trouble blocking out noise in the room.

    a. very frequently
    b. frequently
    c. sometimes
    d. almost never

APPENDIX G

INSTRUCTOR ORIENTATION AND TRAINING WORKSHOP

WORKSHOP Session #1

I. Introduction

    A. Everyone introduces self and tells what school they are from
        and why they volunteered--what they hope to get out of work-
        shop--what their agenda is.

    B. Today's schedule: Going over Study Skill techniques like a
        student.

    C. Why these methods work: They get the student involved with the
        material so that he or she translates the information into their
        own words.

II. Reading Comprehension

    A. Hand out passage on Satisfying Needs--We choose this passage
        because it deals with teaching methods and is also useful for
        demonstrating questionning and networking.

        1. Questionning Method (Page 2)

            a. Find main idea of first paragraph.
            b. Write question about each paragraph.

        2. Networking (Page 13)

        3. Problem Solving worksheets (Page 25)

III. Test Taking

    A. No substitute for knowledge

    B. Go through Self-Test (Page 29)

IV. Concentration

    A. "Relaxed yet alert"

        1. Slow Deep Breathing exercises (Page 5) read, then do.

    B. Self-talk or self-coaching

        1. Pre-verbal/stream of consciousness
        2. Example: Dialogue with self--2 chairs
        3. Guided fantasy--preparing for Promotion test (WAPS)

V.   Memorization

    A.   Mnemonics--memory aids or tricks; be creative; another way
       to get student actively involved

       1.   Elaboration

          a.   ARITHMETIC
          b.   ENCYCLOPEDIA
          c.   Color Code

0	Black	Bad
1	Brown	Booze
2	Red	Rots
3	Orange	Our
4	Yellow	Young
5	Green	Guts
6	Blue	But
7	Violet	Vodka
8	Gray	Goes
9	White	Well

       2.   Mental Pictures

          a.   AFM-127-100   Explosive Safety handbook
             AFM-127-101   Ground Safety handbook
             (Page 4)

          b.   M23-Igniter: Picture 2 or 3 Matches striking against
             each other to Ignite a bomb.

          c.   BLU-27A/B - Fire Bomb: BLU - Blewey; picture 27
             Active Bullets going Blewey.

          d.   LAU-3/A - Rocket Launcher: Picture 3 Airmen launching
             a rocket out of a giant sling shot.

       3.   Grouping

          a.   Social Security number

          b.   Telephone numbers

          c.   Procedure for loading a bomb onto an aircraft: PAPMLFI

             1.   Prepare Aircraft
             2.   Prepare Munitions
             3.   Loading
             4.   Fusing
             5.   Inspecting
             6.   PAPMLFI: Powder And Power Means Lots of Fuming Ignition

VI. Conclusion

    A. We are available for consultation

    B. Tomorrow's schedule: HOMEWORK: Make list of things that tell
       you a student is having trouble.

WORKSHOP   Session #2

I. Diagnosing: Problem Solving Process on Part of the Instructor.
   (Network today's session on the board)

    A. IDENTIFY PROBLEM: Clues that student is having a problem.

       1. External (Observational)

          a. Slow progress
          b. Poor grades
          c. Student falls asleep in carrel
          d. Study Skills Questionnaire

       2. Internal (Student/Instructor communication necessary)

          a. Can't answer instructor questions
          b. Fear
          c. Student says s/he is having trouble

    B. GATHER INFORMATION: Talk to student

       1. In dialogue there are three areas for communication problems
          (Page 15 in Reading Comprehension)

          a. From thoughts to words - Person A
          b. Hearing on part of Person B
          c. Hearing on part of Person A after B responds

       2. How can instructor minimize these errors? (they generate list)

          a. Make student comfortable

             (1) Instructor doesn't interrupt
             (2) Instructor doesn't laugh at or berate student
             (3) Instructor shows he or she cares by giving student
                 all his or her attention.

          b. Attending Behavior (handout)

             (1) Posture
             (2) Eye contact
             (3) Reflection--put examples on the board

  c. Probing--asking questions

   (1) Examples on the board
   (2) When ask question have to know what to do with the answer--
     knowing what to keep is the key--what is good information
   (3) Hand out Diagnostic Questions and go over them--these
     are rules of thumb.

WORKSHOP Session #3

I. Administer questionnaire

II. Case histories